DAIKIN

Transformerless 400 V specifications

AKW14A-500	AKW43A-500	AKW90A-500
AKW18A-500	AKW45A-500	AKW92A-500
AKW32A-500	AKW56A-500	
AKW35A-500	AKW58A-500	

Uses R410 refrigerant

WATER CHILLING UNIT

Inverter Controlled Chiller

For cooling with water/ethylene glycol solution, Circulating type

I N D E X

AKW10 series

Lightweight, Compact,

Transformerless 400V

NEW Medium/large models added

Inverter Controlled Chiller 10 series

DAIKIN INDUSTRIES, LTD.
Oil Hydraulic Division
Oil Hydraulic Equipment

Inverter Controlled Chiller

For cooling with water/ethylene glycol solution | Circulating type |

Features

Lightweight, compact, and transformerless 400V chiller

- The dimensions are the same as standard models (200 V), so no design changes are needed for different voltages.

Easier to use, with an expanded range of application

- Expanded operating temperature range (AKW14A to 45A only (Note))

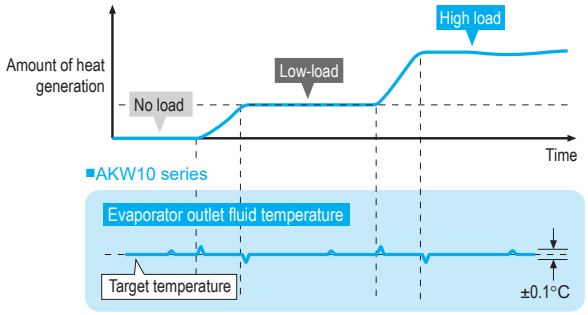
AKW9 series	AKW10 series
10°C to 40°C	5°C to 45°C

Note) From Series 9 of AKW56A to 92A, the operating temperature range is 5°C to 45°C.

- Ethylene glycol solution added to the fluids that can be used

Acclaimed high-accuracy temperature control

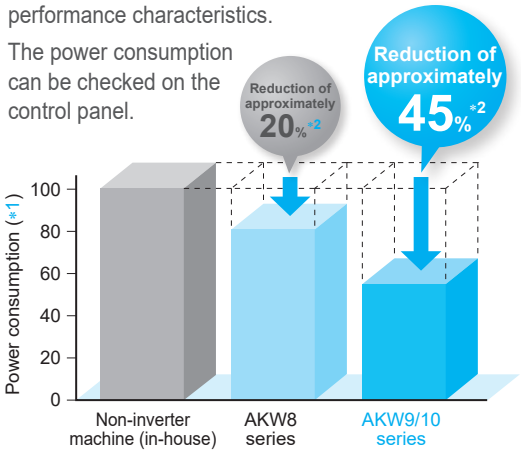
- Acclaimed high-accuracy ±0.1°C oil temperature control
- The cooling capacity resolution in the low-load range has been improved by optimal control of the compressor/inverter and electronic expansion valve.
- ±0.1°C oil temperature control realized over a load range from 0% (no load) to 100%.



Note: Pattern diagram with the heating load stabilized at 0 - 100%

Achieves high energy-saving performance

- Achieves high energy-saving performance with the incorporation of a DAIKIN original IPM motor. Together with R410A refrigerant it offers high coefficient of performance characteristics.
- The power consumption can be checked on the control panel.



*1. The comparison reduction costs are based on a DAIKIN non-inverter system and are shown as 100% consumption.
*2. Measured during the operation patterns for DAIKIN models

Reliable in challenging factory environments

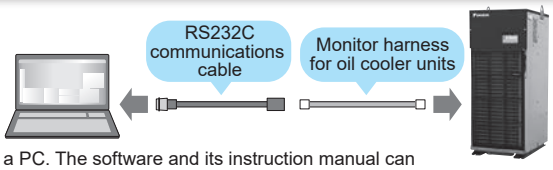
- The control panel ingress protection is equivalent to an IP54 rating.
- Electronic components resistant to sulfidation have been incorporated.
- The specifications for withstanding vibration during transport are matched to actual situations.

Reduced environmental load

- Complies with environmental regulations, e.g. by adopting printed circuit boards with lead-free solder.

Simple monitoring of the operating status

- The room temperature, fluid temperature, and other internal data can be monitored at a personal computer using Hybrid-Win*. This data can be displayed collectively, making it easy to grasp the operating status.



* Hybrid-Win is utility software to monitor the internal status of DAIKIN hybrid systems using a PC. The software and its instruction manual can be downloaded from the website "http://www.daikinpmc.com/" free of charge by completing the user registration process.
* The communications cable and the monitor harness must be purchased separately.

Superior functionality remains unchanged

●Refrigerant gas shortage detection function

When the refrigerant gas leak status occurs (cooling disabled), alarm signals are output. Prevents damage to the machine and machining defects.

●Temperature warning function

A warning signal can be output when the targeted fluid temperature or room temperature is out of the user-selected range.

● Autotuning function

An autotuning function that automatically sets the control gain according to the system installed (tank fluid volume, piping, etc.) greatly reduces adjustment time at the trial run.

● 999-hour timer function (ON timer)

The operation start time can be set in a range between 0 and 999 hours (in hour units).

● Predictive maintenance function

◆A warning signal is output to notify that maintenance is required when the air filter or condenser becomes clogged.

◆When a thermistor fault (control failure) occurs, emergency operation is possible using another operation mode. This minimizes effects due to line stoppages.

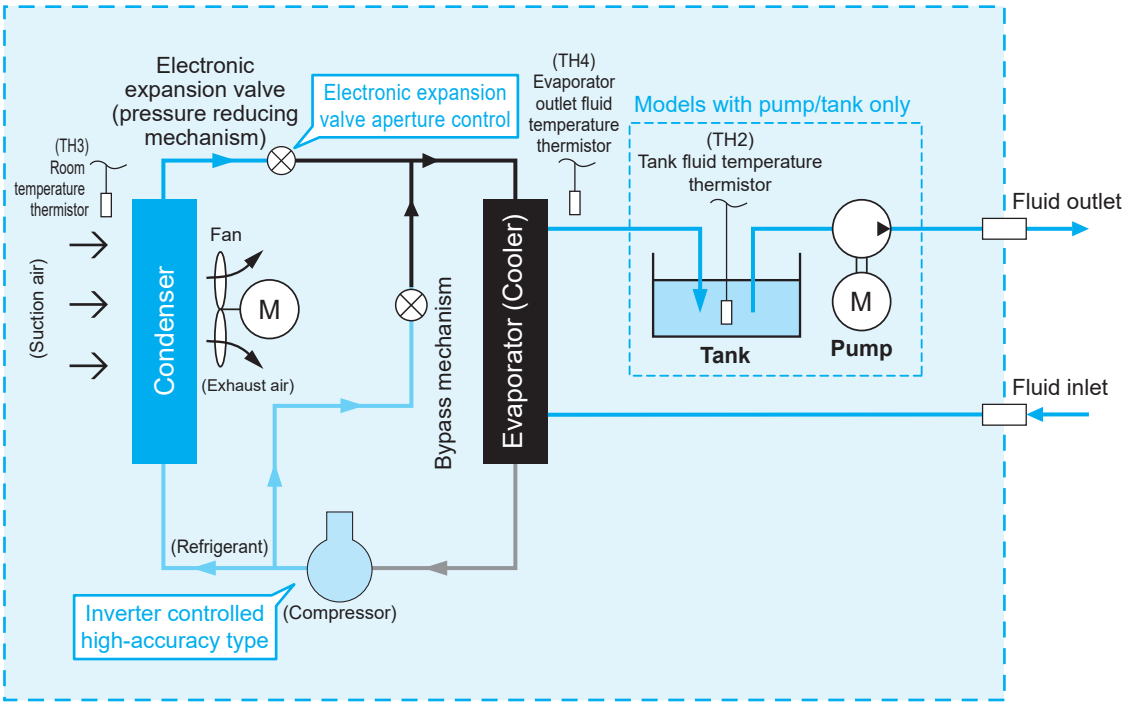
Easy to operate, and easy to maintain

- Easy-to-operate control panel that shows power consumption
- Plug-in terminal block makes tools unnecessary when connecting signals.
- Air filter structure that resists condenser clogging due to oil mist

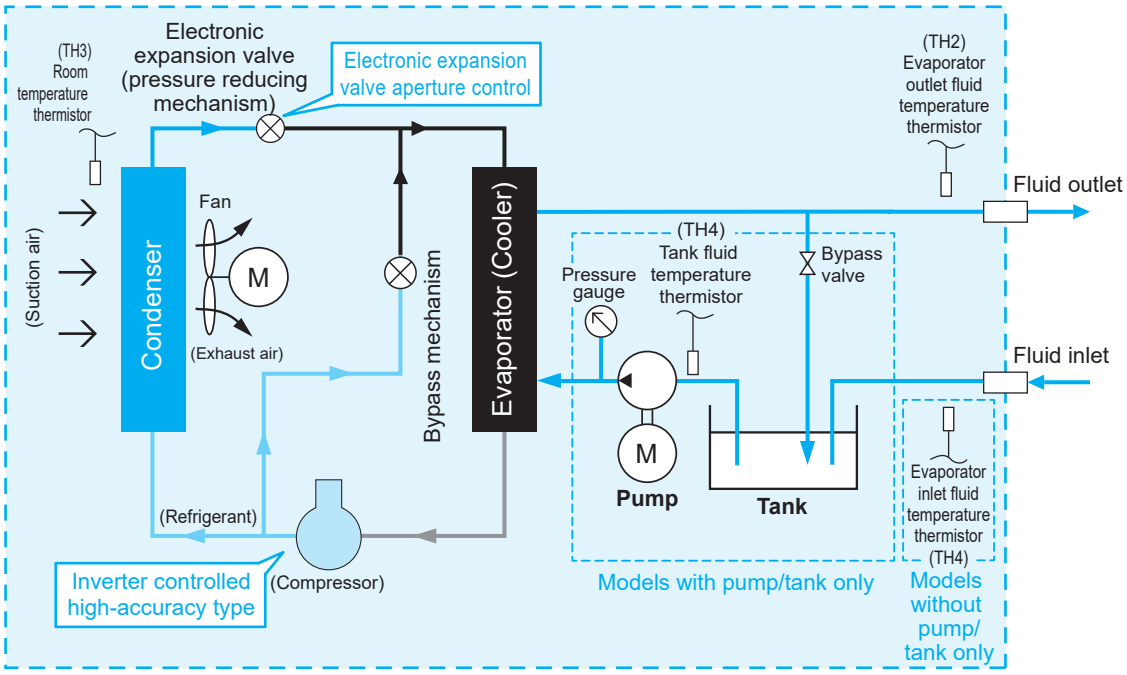
System Diagram

- Highly accurate temperature control model by inverter control
- Available with or without a pump/tank
- Refrigerant is R410A (Ozone Depletion Potential [ODP]: 0).

●Principle and Overall System Diagram (AKW14A to 45A)



●Principle and Overall System Diagram (AKW56A to 92A)



Nomenclature

AKW	14	A	–	＊＊＊	＊
1	2	3	4	5	6

1 Standard type

AKW: High-accuracy inverter controlled chiller
[Circulation type for cooling with water/ethylene glycol solution]

2 Cooling capacity

14：1.4 kW　56：5.6 kW
18：1.8 kW　58：5.8 kW
32：3.2 kW　90：9.0 kW
35：3.5 kW　92：9.2 kW
43：4.3 kW
45：4.5 kW

3 Symbol of series

(Symbol to represent model change)

A: 10 series

4 Symbol of option type/Non-standard number

Options and their combinations
(Refer to the following table.)

5 Special specifications (high-flow-rate/high head pumps, specified paint colors, etc.)

– ＊＊＊ (3-digit number), C ＊＊＊ (3-digit number), etc.
Please consult us separately.
–500 indicates standard specifications (380 V/400 V/415 V)

6 Special specifications (specified packing specifications, communication options, etc.)

J: Communications option
RS485/Modbus protocol

Options and their combinations

■AKW 14A/32A/43A
(with pump/tank)

Option symbol	With breaker	Compliance with CE	With cover
–	–	–	–
B	✓	–	–
C	–	✓	–
671	–	–	✓
D	✓	✓	–
B671	✓	–	✓
C671	–	✓	✓
D671	✓	✓	✓

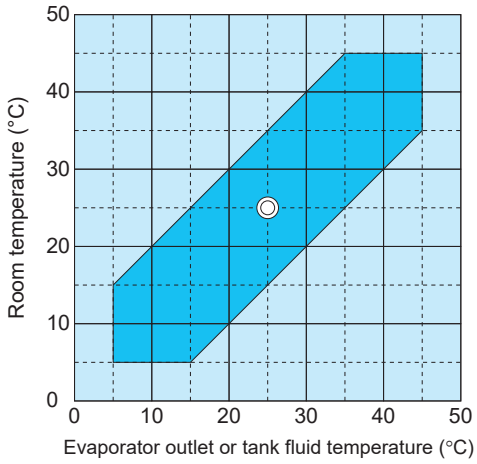
■AKW 18A/35A/45A (without pump/tank)
AKW 56A to 92A

Option symbol	With breaker	Compliance with CE
–	–	–
B	✓	–
C	–	✓
D	✓	✓

Applications

Machining centers, NC lathes, Semiconductor production equipment,
Laser cutting machines/Laser oscillators, Electrical discharge machines/Beam welding machines,
Various analyzing apparatus/Medical equipment, etc.

Operating Temperature Range



Note: 1. The mark "◎" shows the standard point.
2. Be sure to use the unit within the range of use specified in ▭.
(Use outside this range may cause unit failure.)

Water Quality Standard

●For the cooling fluid, use clean fresh water that satisfies the water quality standards (including for that for dilution of ethylene glycol solution) as indicated in the table below.
(Taken from Guideline of Water Quality for Refrigeration and Air Conditioning Equipment (JRA-GL-02-1994).)

	Item	Unit	Standard Value	Tendency	
				Corrosion	Scale Generation
Standard items	pH (25°C)	–	6.0 to 8.0	✓	✓
	Electrical conductivity	mS/m (25°C)	30 maximum	✓	✓
	Chloride ion	mgCl^-/L	50 maximum	✓	
	Sulfate ion	mgSO_4^{2-}/L	50 maximum	✓	
	Acid consumption (pH4.8)	mg$CaCO_3$/L	50 maximum		✓
	Total hardness	mg$CaCO_3$/L	70 maximum		✓
	Calcium hardness	mg$CaCO_3$/L	50 maximum		✓
	Ionic silica	mgSiO_2/L	30 maximum		✓
Reference items	Iron	mgFe/L	0.3 maximum	✓	✓
	Copper	mgCu/L	0.1 maximum	✓	
	Sulfate ion	mgS^{2-}/L	Not to be detected	✓	
	Ammonium ion	mgNH^{4+}/L	0.1 maximum	✓	
	Residual chlorine	mgCl/L	0.3 maximum	✓	
	Free carbon dioxide	mgCO_2/L	4.0 maximum	✓	

∗ A checkmark in a row indicates that the relevant factor is associated with the tendency for corrosion or scale formation.
∗ Even if the standards are satisfied, there is no guarantee that corrosion will be completely prevented.

Specifications
AKW14A to 45A

			With pump/tank									Without pump/tank								
Equivalent horsepower of chiller (HP)			0.5			1.2			1.5			0.5			1.2			1.5		
Model name			AKW14A-500			AKW32A-500			AKW43A-500			AKW18A-500			AKW35A-500			AKW45A-500		
			Standard	B	C	Standard	B	C	Standard	B	C	Standard	B	C	Standard	B	C	Standard	B	C
Cooling capacity (50/60 Hz) ∗1 kW			1.4/1.4			3.2/3.2			4.3/4.3			1.8/1.8			3.5/3.5			4.5/4.5		
Supply power ∗2			Three phase AC 380/400/415 V 50/60 Hz																	
Circuit voltage	Main circuit		Three phase AC 380/400/415 V 50/60 Hz																	
	Operating circuit		DC12/24 V																	
Max. power consumption Max. current consumption	380 V 50/60 Hz		1.56 kW/3.1 A			2.11 kW/4.0 A			2.36 kW/4.4 A			0.81 kW/1.7 A			1.36 kW/2.7 A			1.60 kW/3.1 A		
	400 V 50/60 Hz		1.56 kW/3.0 A			2.11 kW/3.9 A			2.36 kW/4.3 A			0.81 kW/1.6 A			1.36 kW/2.6 A			1.60 kW/3.0 A		
	415 V 50/60 Hz		1.57 kW/2.9 A			2.12 kW/3.8 A			2.37 kW/4.2 A			0.81 kW/1.6 A			1.36 kW/2.5 A			1.61 kW/2.9 A		
Exterior color			Ivory white																	
External dimensions (H × W × D) mm			690 × 360 × 700			815 × 360 × 700			915 × 360 × 700			650 × 360 × 440			775 × 360 × 440			875 × 360 × 440		
Compressor (Hermetic DC swing type)			Equivalent to 0.4 kW			Equivalent to 0.75 kW			Equivalent to 1.1 kW			Equivalent to 0.4 kW			Equivalent to 0.75 kW			Equivalent to 1.1 kW		
Evaporator			Brazed plate type																	
Condenser			Cross-fin coil type																	
Propeller fan	Motor		ϕ240, 54 W			ϕ300, 54 W						ϕ240, 54 W			ϕ300, 54 W					
Pump ∗3	Motor		0.55 kW × 2P									—								
	Head m		26.5/38.5 ±7% at 10 L/min, 25.5/37.5 ±7% at 15 L/min									—								
Temperature control (Selectable)	Synchronization type	Standard	Room temperature or machine temperature ∗4 (Set to "Room temperature: Mode 5" by default)									Room temperature or machine temperature ∗4 (Set to "Room temperature: Mode 3" by default)								
		Object to be controlled	Evaporator outlet fluid temperature or tank fluid temperature (Set to tank fluid temperature by default)									Evaporator outlet fluid temperature								
		Synchronization range	–9.9 to +9.9 against the reference temperature (Set at 0.0 by default)																	
	Fixed type	Object to be controlled	Evaporator outlet fluid temperature or tank fluid temperature									Evaporator outlet fluid temperature								
		Range	5 to 45																	
Refrigerant control			Rotation speed control of compressor by inverter + Opening rate control of electric expansion valve																	
Refrigerant: R410A (GWP: 2090) ∗5	Filling amount kg		0.56			0.79			0.84			0.56			0.79			0.84		
	Carbon dioxide equivalent tCO_2eq		1.18			1.66			1.76			1.18			1.66			1.76		
Protection equipment			Overcurrent relay (for a pump motor), reverse-phase protection device, restart prevention timer, low room temperature protection thermistor, high fluid temperature protection thermistor, low fluid temperature protection thermistor, discharge pipe thermistor, condenser thermistor, inlet pipe thermistor (freeze protection), refrigerant leakage detector, inverter protection device, high-pressure pressure switch (C type only), compressor protection thermostat and wiring circuit breaker (B type only)																	
Operating range	Room temperature °C		5 to 45																	
	Evaporator outlet/tank fluid temperature °C		5 to 45																	
	External pressure loss		0.25/0.37 MPa max. (50/60 Hz) at 10 L/min			0.25/0.37 MPa maximum (50/60 Hz) at 15 L/min						—								
	Cooling fluid circuit withstand pressure MPa		–									0.5 MPa								
	Circulating volume	Rated circulating volume L/min	10			15			15			10			15			15		
		Circulating volume range L/min	6 to 15			10 to 20			10 to 30			6 to 15			10 to 20			10 to 30		
Acceptable fluid			Industrial purified water, ethylene glycol solution (50 vol% or less)																	
Connecting tube	Fluid inlet		Rc1/2																	
	Fluid outlet		Rc1/2																	
	Evaporator drain		Rc1/2 (Plugged)									—								
	Tank drain		Rc3/8 (Plugged)									—								
Noise level (value equivalent to measurement in an anechoic chamber) dB(A) (Front 1 m, height 1.55 m) ∗6			60			61			62			60			61			62		
Permissible transport vibration ∗7			Up and down vibration 14.7 m/s^2 × 2.5 hr (7.5 to 100 Hz sweep/five min.)																	
Protection grade			IP2X ∗8																	
Mass kg			63			68			69			38			43			44		
Internal molded-case circuit breaker (Rated current) A			—	10	—	—	10	—	—	10	—	—	10	—	—	10	—	—	10	—
Tank capacity L			10 ∗9									—								
Items prepared by the customer	Earth leakage breaker (Rated current) ∗10 A		10																	

Note: ∗1. The cooling capacity indicates the value at the standard point (fluid temperature: 25°C, room temperature: 25°C, fluid used: water, rated circulating volume, 1 atm). This unit has about ±5% of product tolerance.
The cooling capacity is approximately 10% lower, compared to water, when using ethylene glycol solution. (With 50% concentration)
∗2. Use a commercial power supply for the power source. The use of an inverter power supply may cause burn damage to the machine.
The voltage fluctuation range should be within ±10%. If it is more than ±10%, please consult us.
∗3. If the pump capacity needs to be changed, please consult us.
∗4. The machine synchronization thermistor optionally available is required for this function. (Refer to Page 19 for details.)
∗5. The refrigerant is enclosed in a sealed container. The SDS (Safety Data Sheet) for R410A refrigerant is provided with to C type units.
∗6. The rotational speed of the fan varies depending on the room temperature to conserve energy. Therefore, it is normal for the noise level to vary accordingly.
∗7. The specifications for permissible transport vibration are those of a standard unit.
∗8. Electric component section ingress protection: IP54 or equivalent (However, use piping conduits etc. rated at least IP54 at wiring ports.)
∗9. The yellow line on the tank oil level gauge shows the highest oil level and the red line the lowest oil level.
∗10. The earth leakage breaker is not supplied with this product. Please prepare it yourself.

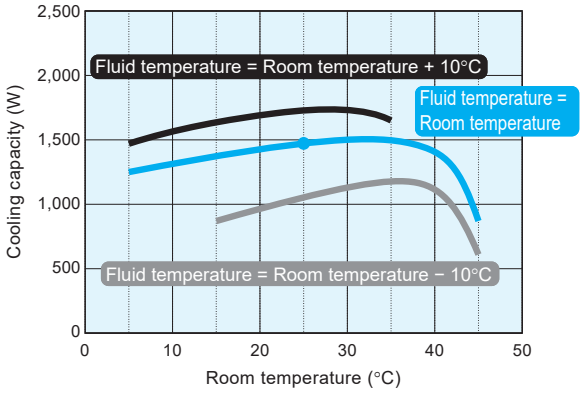
Specifications
AKW56A to 92A

			With pump/tank						Without pump/tank					
Equivalent horsepower of chiller (HP)			2.0			3.0			2.0			3.0		
Model name			AKW56A-500			AKW90A-500			AKW58A-500			AKW92A-500		
			Standard	B	C	Standard	B	C	Standard	B	C	Standard	B	C
Cooling capacity (50/60 Hz) *1 kW			5.6/5.6			9.0/9.0			5.8/5.8			9.2/9.2		
Supply power *2			Three phase AC 380/400/415 V 50/60 Hz											
Circuit voltage	Main circuit		Three phase AC 380/400/415 V 50/60 Hz											
	Operating circuit		DC12/24 V											
Max. power consumption Max. current consumption	380 V 50/60 Hz		3.52 kW/6.4 A			4.96 kW/9.9 A			2.39 kW/4.4 A			3.83 kW/7.9 A		
	400 V 50/60 Hz		3.53 kW/6.3 A			4.97 kW/9.5 A			2.40 kW/4.3 A			3.84 kW/7.5 A		
	415 V 50/60 Hz		3.54 kW/6.2 A			4.98 kW/9.3 A			2.40 kW/4.2 A			3.84 kW/7.4 A		
Exterior color			Ivory white											
External dimensions (H × W × D) mm			1197 × 470 × 500			1307 × 560 × 620			1197 × 470 × 500			1307 × 560 × 620		
Compressor (Hermetic DC swing type)			Equivalent to 1.5 kW			Equivalent to 2.2 kW			Equivalent to 1.5 kW			Equivalent to 2.2 kW		
Evaporator			Brazed plate type											
Condenser			Cross-fin coil type											
Propeller fan	Motor		ϕ400, 100 W			ϕ455, 100 W			ϕ400, 100 W			ϕ455, 100 W		
Pump *3	Motor		0.43/0.74 kW × 2 P						—					
	Head m		34/49$^{\pm 7\%}$ at 25 L/min			31/47$^{\pm 7\%}$ at 40 L/min			—					
Temperature control (Selectable)	Synchronization type	Standard	Room temperature or machine temperature *4 (Set to “Room temperature: Mode 3” by default)											
		Object to be controlled	Evaporator outlet fluid temperature or tank fluid temperature (Set to tank fluid temperature by default)						Evaporator outlet fluid temperature or evaporator inlet fluid temperature (Set to evaporator inlet fluid temperature by default)					
		Synchronization range	–9.9 to +9.9 against the reference temperature (Set at 0.0 by default)											
	Fixed type	Object to be controlled	Evaporator outlet fluid temperature or tank fluid temperature						Evaporator outlet fluid temperature or evaporator inlet fluid temperature					
		Range	5 to 45											
Refrigerant control			Rotation speed control of compressor by inverter + Opening rate control of electric expansion valve											
Refrigerant: R410A (GWP: 2090)*5	Filling amount kg		1.02			1.42			1.02			1.42		
	Carbon dioxide equivalent tCO_2eq		2.14			2.97			2.14			2.97		
Protection equipment			Overcurrent relay (for a pump motor), reverse-phase protection device, restart prevention timer, low room temperature protection thermistor, high fluid temperature protection thermistor, low fluid temperature protection thermistor, discharge pipe thermistor, condenser thermistor, inlet pipe thermistor (freeze protection), refrigerant leakage detector, inverter protection device, high-pressure pressure switch (C type only), compressor protection thermostat and wiring circuit breaker (B type only)											
Operating range	Room temperature °C		5 to 45											
	Evaporator outlet fluid temperature °C		5 to 45											
	External pressure loss		0.24/0.38 MPa maximum (50/60 Hz) at 25 L/min			0.14/0.28 MPa maximum (50/60 Hz) at 40 L/min			—					
	Cooling fluid circuit withstand pressure MPa		—						1.0					
	Circulating volume	Rated circulating volume L/min	25			40			25			40		
		Circulating volume range L/min	13 to 30			25 to 45			13 to 30			25 to 45		
Acceptable fluid			Industrial purified water, ethylene glycol solution (50 vol% or less)											
Connecting tube	Fluid inlet		Rc3/4											
	Fluid outlet		Rc3/4											
	Evaporator drain		—											
	Tank drain		Rc3/8 (Plugged)						—					
Noise level (value equivalent to measurement in an anechoic chamber) dB(A) (Front 1 m, height 1.55 m)*6			65			67			65			67		
Permissible transport vibration*7			Up and down vibration 14.7 m/s^2 × 2.5 hr (7.5 to 100 Hz sweep/five min.)											
Protection grade			IP2X *8											
Mass kg			94			116			70			88		
Internal molded-case circuit breaker (Rated current) A			—	15	—	—	20	—	—	15	—	—	20	—
Tank capacity L			15 *9			20 *9			—					
Items prepared by the customer	Earth leakage breaker (Rated current)*10 A		15			20			15			20		

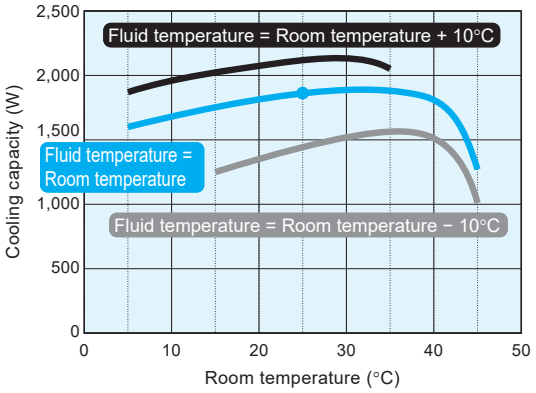
Refer to Page 5 for explanatory notes.

Cooling Capacity Characteristic Chart

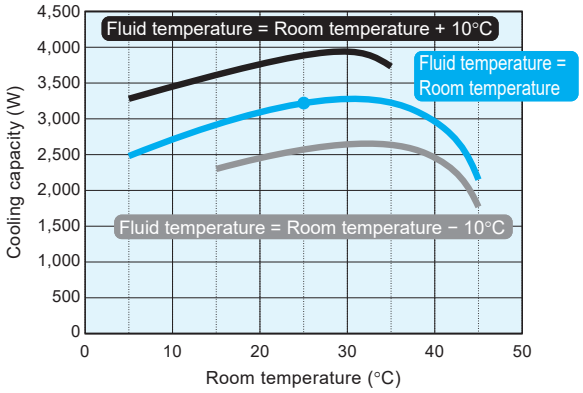
AKW14A



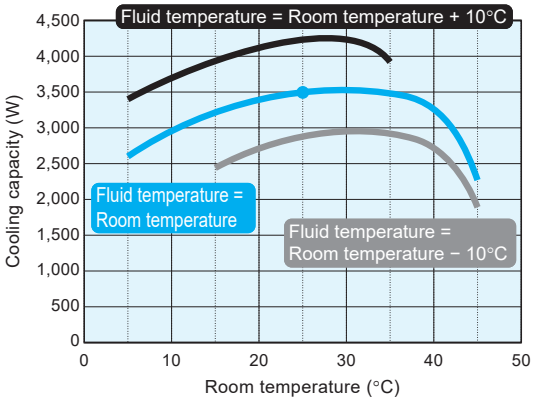
AKW18A



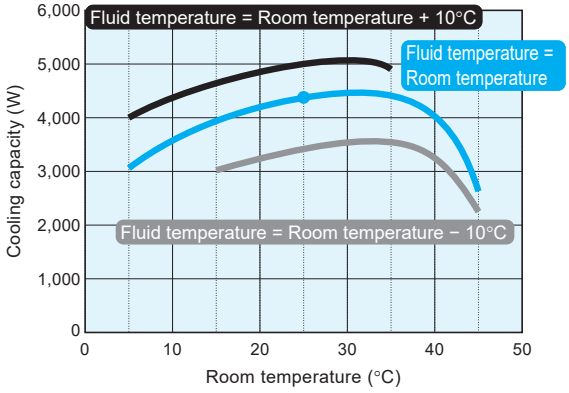
AKW32A



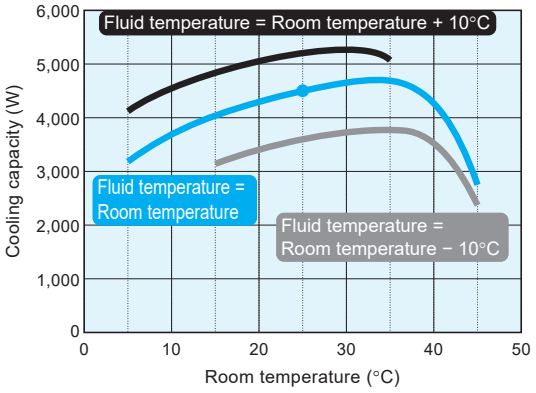
AKW35A



AKW43A

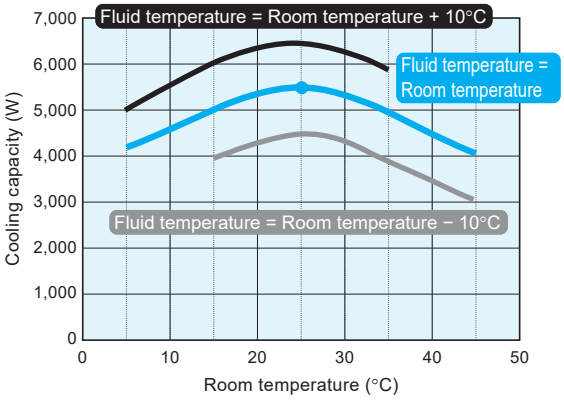


AKW45A

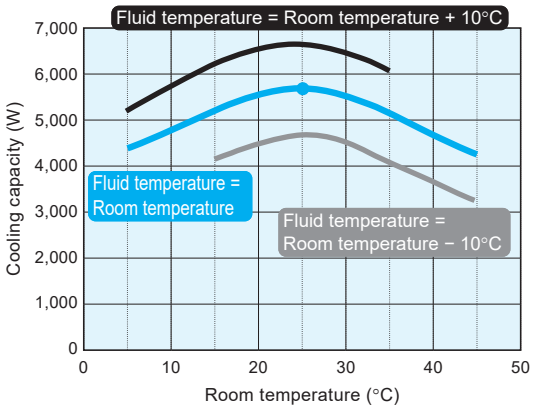


1. The "●" symbol indicates the standard point. (Room temperature: 25°C/Fluid temperature: 25°C, Fluid used: water)
2. The cooling capacity indicates the value at the rated circulation.

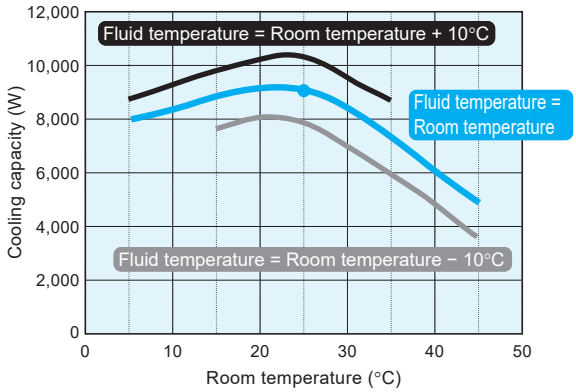
AKW56A



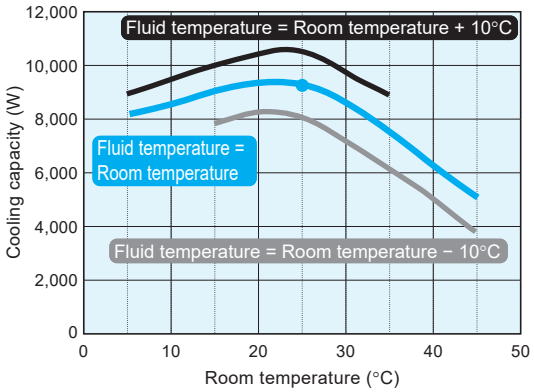
AKW58A



AKW90A



AKW92A

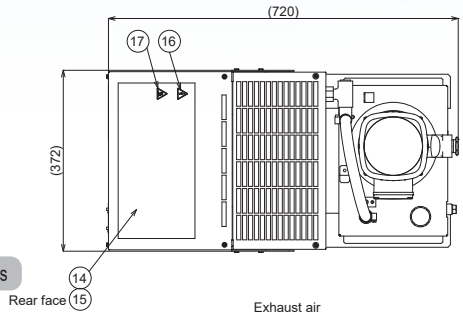


1. The "●" symbol indicates the standard point. (Room temperature: 25°C/Fluid temperature: 25°C, Fluid used: water)
2. The cooling capacity indicates the value at the rated circulation.

External Dimension Diagram

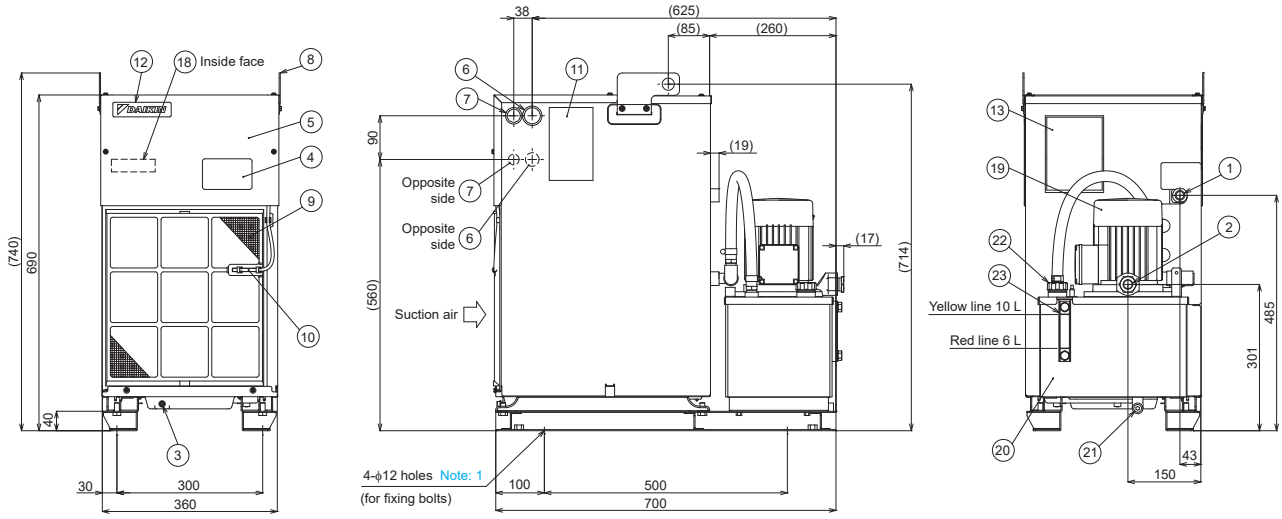
AKW14A (−) (B) (C) 500

With pump/tank | Without pump/motor covers



Part No.	Name	Description
1	Coolant inlet	Rc1/2
2	Coolant outlet	Rc1/2
3	Drain	M6 (with Plug)
4	Control panel	
5	Switch box cover	
6	Power intake hole (Right/Left)	ϕ28 Hole
7	Signal intake hole (Right/Left)	ϕ22 Hole
8	Eye plate	ϕ22 Hole
9	Air filter	
10	Thermister (Air)	
11	Manufacture label	
12	Brand name label	

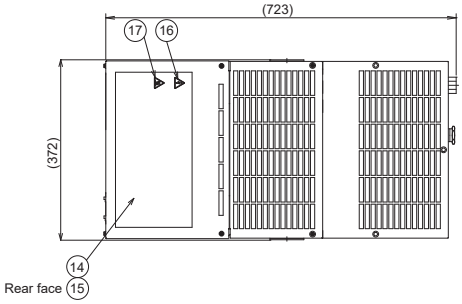
Part No.	Name	Description
13	Indication label	
14	Caution label	
15	Wiring diagram label	
16	Charge label	
17	High temp. caution label	
18	Model name label	
19	Dipping plate pump	
20	Tank	10 L
21	Tank drain	Rc3/8 (with Plug)
22	Charge & Air breather	
23	Level gauge	



Note: 1. M10 hex bolts are recommended as the fixing bolts.

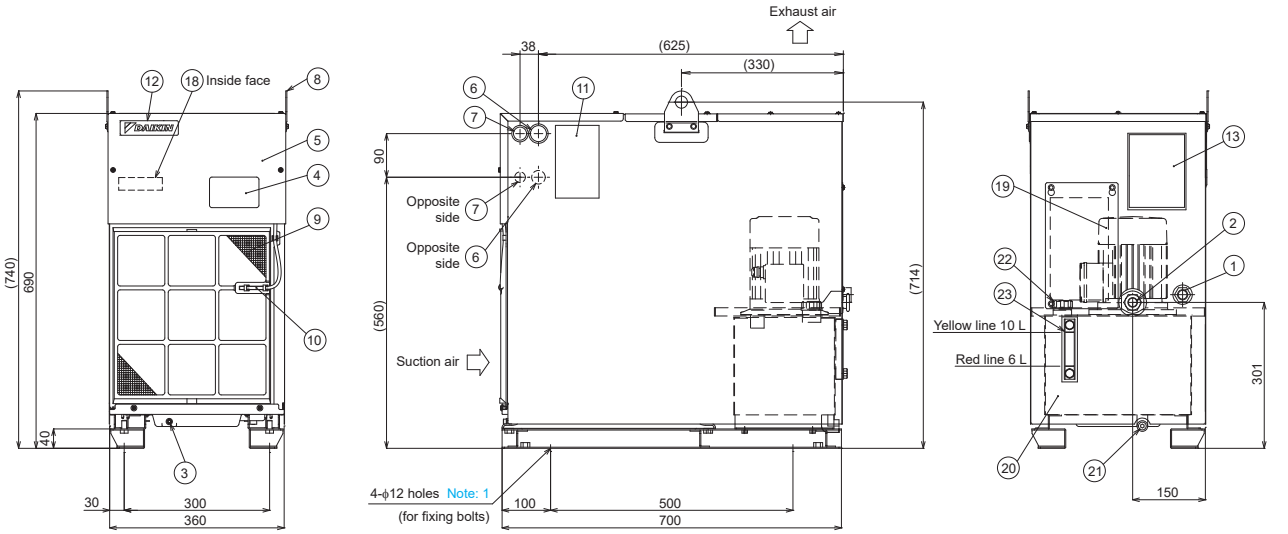
AKW14A (−) (B) (C) 671

With pump/tank | With cover



Part No.	Name	Description
1	Coolant inlet	Rc1/2
2	Coolant outlet	Rc1/2
3	Drain	M6 (with Plug)
4	Control panel	
5	Switch box cover	
6	Power intake hole (Right/Left)	ϕ28 Hole
7	Signal intake hole (Right/Left)	ϕ22 Hole
8	Eye plate	ϕ25 Hole
9	Air filter	
10	Thermister (Air)	
11	Manufacture label	
12	Brand name label	

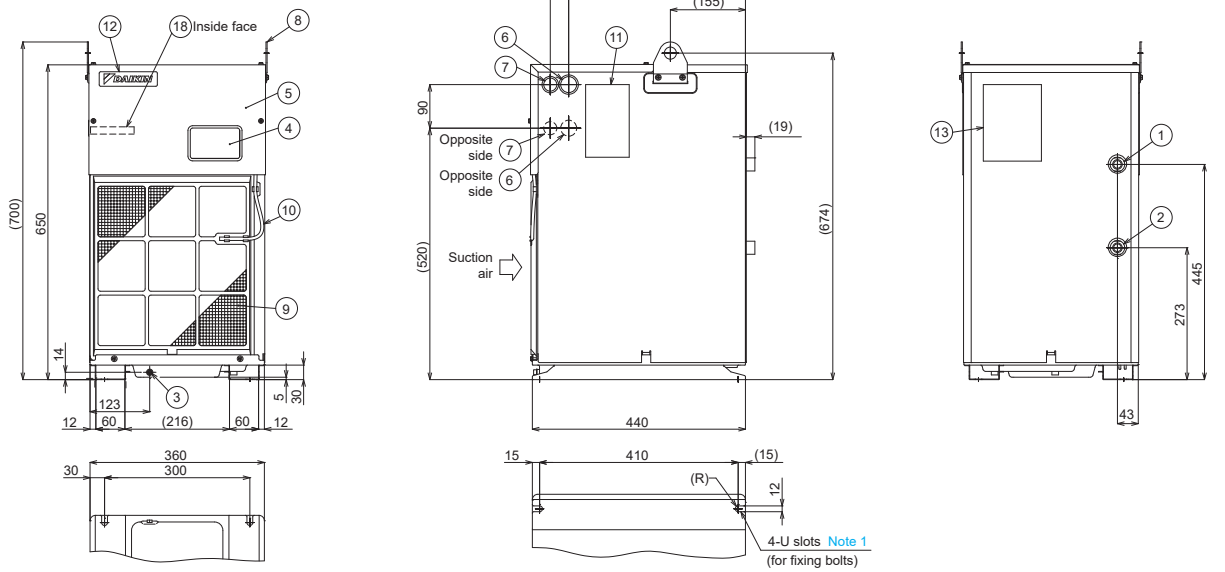
Part No.	Name	Description
13	Indication label	
14	Cation label	
15	Wiring diagram label	
16	Charge label	
17	High temp. caution label	
18	Model name label	
19	Dipping plate pump	
20	Tank	10 L
21	Tank drain	Rc3/8 (with Plug)
22	Charge & Air breather	
23	Level gauge	



Note: 1. M10 hex bolts are recommended as the fixing bolts.

AKW18A (−) (B) (C) 500

Without pump/tank



Part No.	Name	Description
1	Coolant inlet	Rc1/2
2	Coolant outlet	Rc1/2
3	Drain	M6 (with Plug)
4	Control panel	
5	Switch box cover	
6	Power intake hole (Right/Left)	ϕ28 Hole
7	Signal intake hole (Right/Left)	ϕ22 Hole
8	Eye plate	ϕ25 Hole
9	Air filter	
10	Thermister (Air)	
11	Manufacture label	
12	Brand name label	

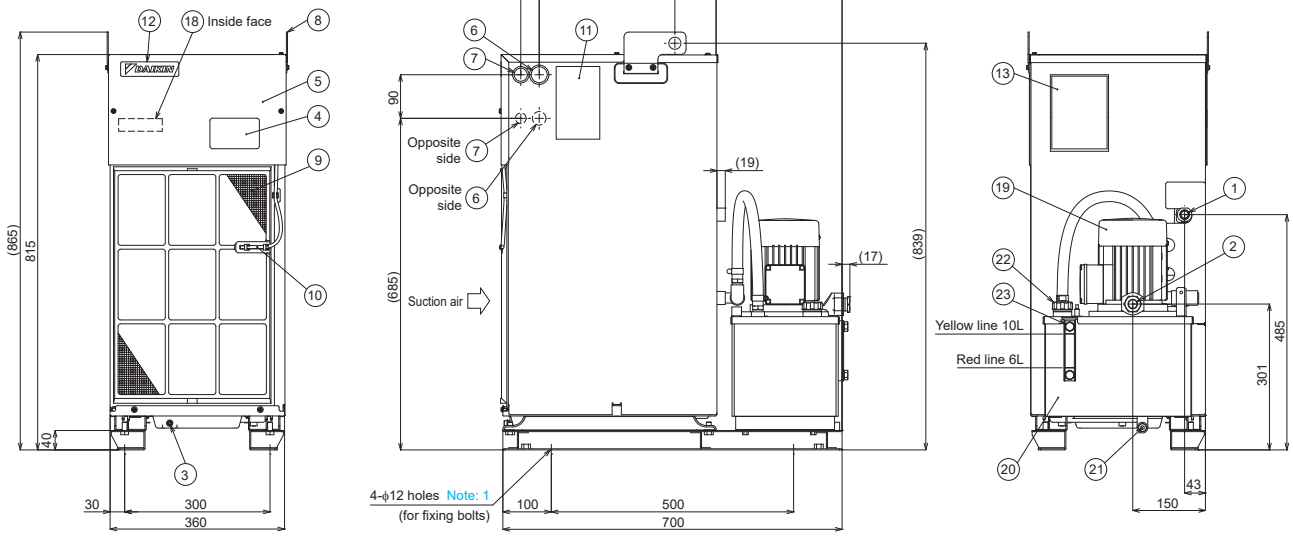
Part No.	Name	Description
13	Indication label	
14	Caution label	
15	Wiring diagram label	
16	Charge label	
17	High temp. caution label	
18	Model name label	

Note: 1. M10 hex bolts are recommended as the fixing bolts.

External Dimension Diagram

AKW32A (−) (B) (C) 500

With pump/tank | Without pump/motor covers



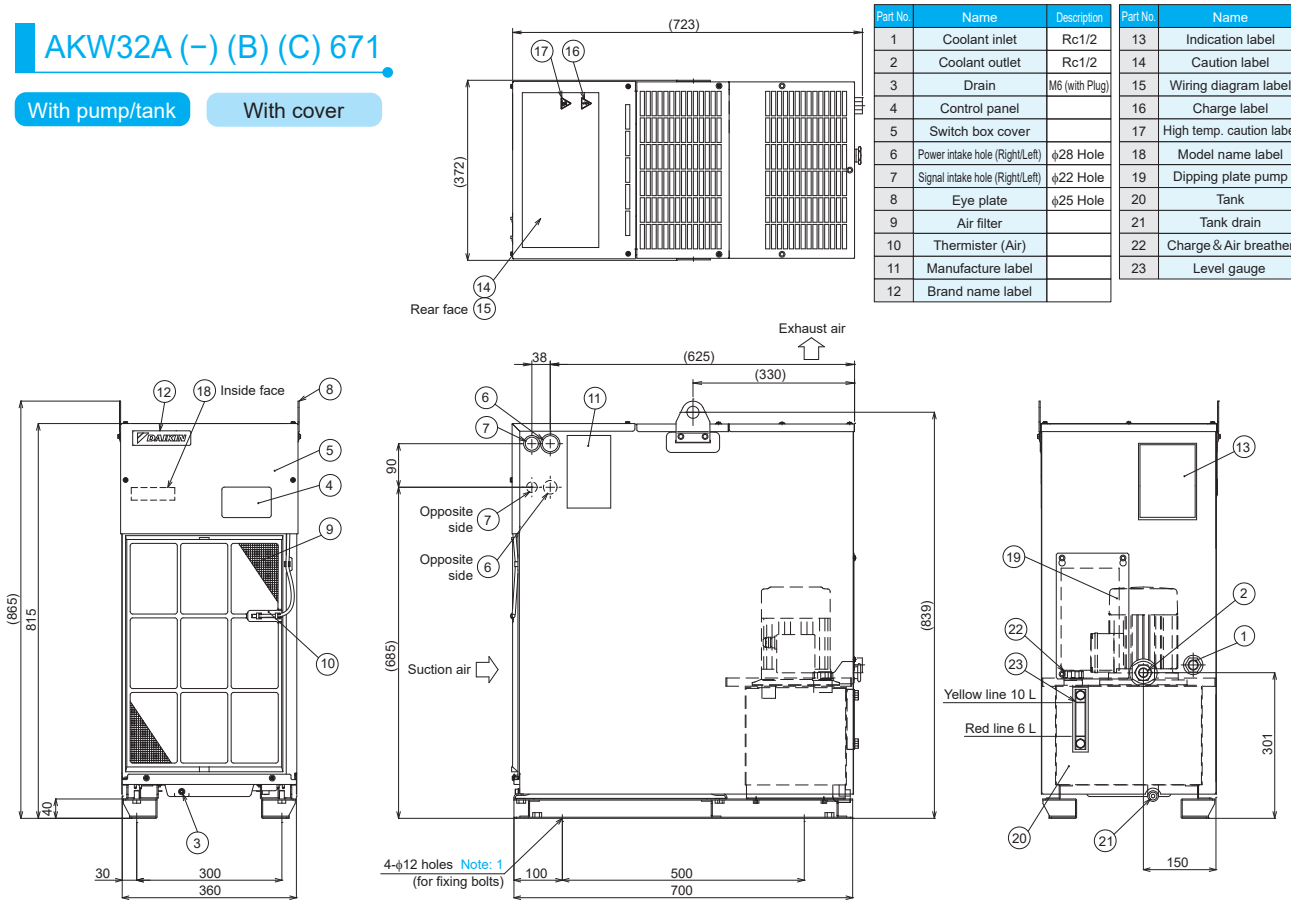
Part No.	Name	Description
1	Coolant inlet	Rc1/2
2	Coolant outlet	Rc1/2
3	Drain	M6 (with Plug)
4	Control panel	
5	Switch box cover	
6	Power intake hole (Right/Left)	ϕ28 Hole
7	Signal intake hole (Right/Left)	ϕ22 Hole
8	Eye plate	ϕ25 Hole
9	Air filter	
10	Thermister (Air)	
11	Manufacture label	
12	Brand name label	

Part No.	Name	Description
13	Indication label	
14	Caution label	
15	Wiring diagram label	
16	Charge label	
17	High temp. caution label	
18	Model name label	
19	Dipping plate pump	
20	Tank	10 L
21	Tank drain	Rc3/8 (with Plug)
22	Charge & Air breather	
23	Level gauge	

Note: 1. M10 hex bolts are recommended as the fixing bolts.

AKW32A (−) (B) (C) 671

With pump/tank | With cover



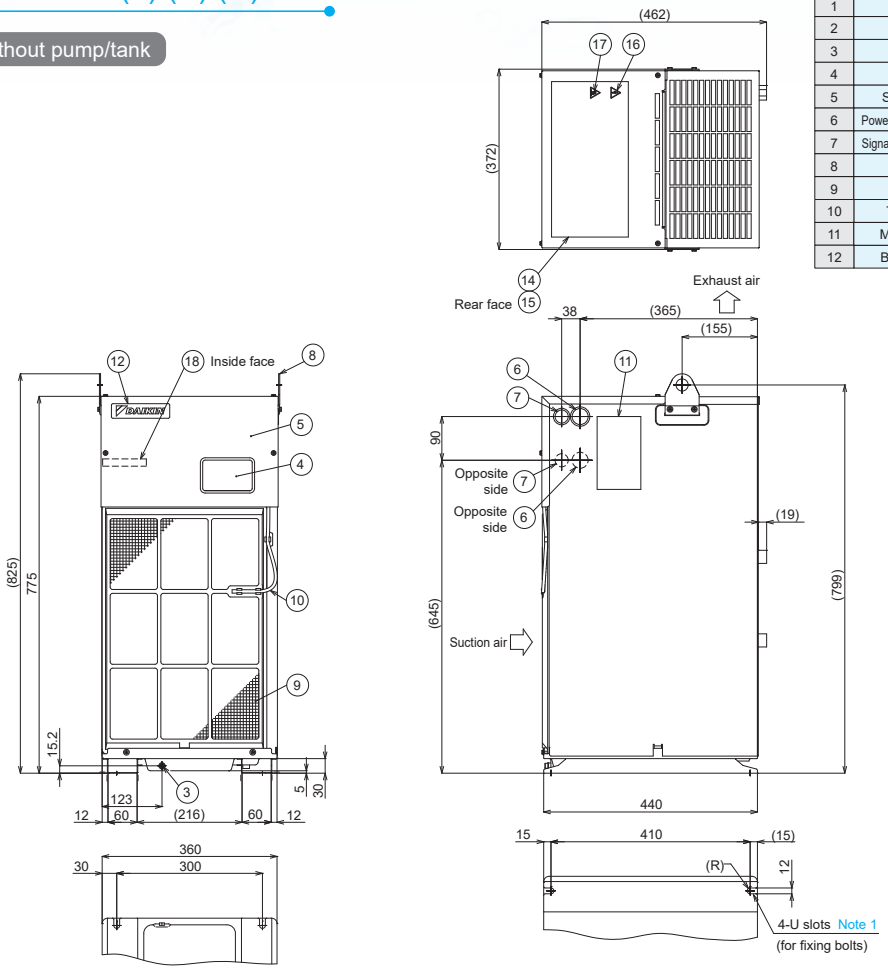
Part No.	Name	Description
1	Coolant inlet	Rc1/2
2	Coolant outlet	Rc1/2
3	Drain	M6 (with Plug)
4	Control panel	
5	Switch box cover	
6	Power intake hole (Right/Left)	ϕ28 Hole
7	Signal intake hole (Right/Left)	ϕ22 Hole
8	Eye plate	ϕ25 Hole
9	Air filter	
10	Thermister (Air)	
11	Manufacture label	
12	Brand name label	

Part No.	Name	Description
13	Indication label	
14	Caution label	
15	Wiring diagram label	
16	Charge label	
17	High temp. caution label	
18	Model name label	
19	Dipping plate pump	
20	Tank	10 L
21	Tank drain	Rc3/8 (with Plug)
22	Charge & Air breather	
23	Level gauge	

Note: 1. M10 hex bolts are recommended as the fixing bolts.

AKW35A (−) (B) (C) 500

Without pump/tank



Part No.	Name	Description
1	Coolant inlet	Rc1/2
2	Coolant outlet	Rc1/2
3	Drain	M6 (with Plug)
4	Control panel	
5	Switch box cover	
6	Power intake hole (Right/Left)	ϕ28 Hole
7	Signal intake hole (Right/Left)	ϕ22 Hole
8	Eye plate	ϕ25 Hole
9	Air filter	
10	Thermister (Air)	
11	Manufacture label	
12	Brand name label	

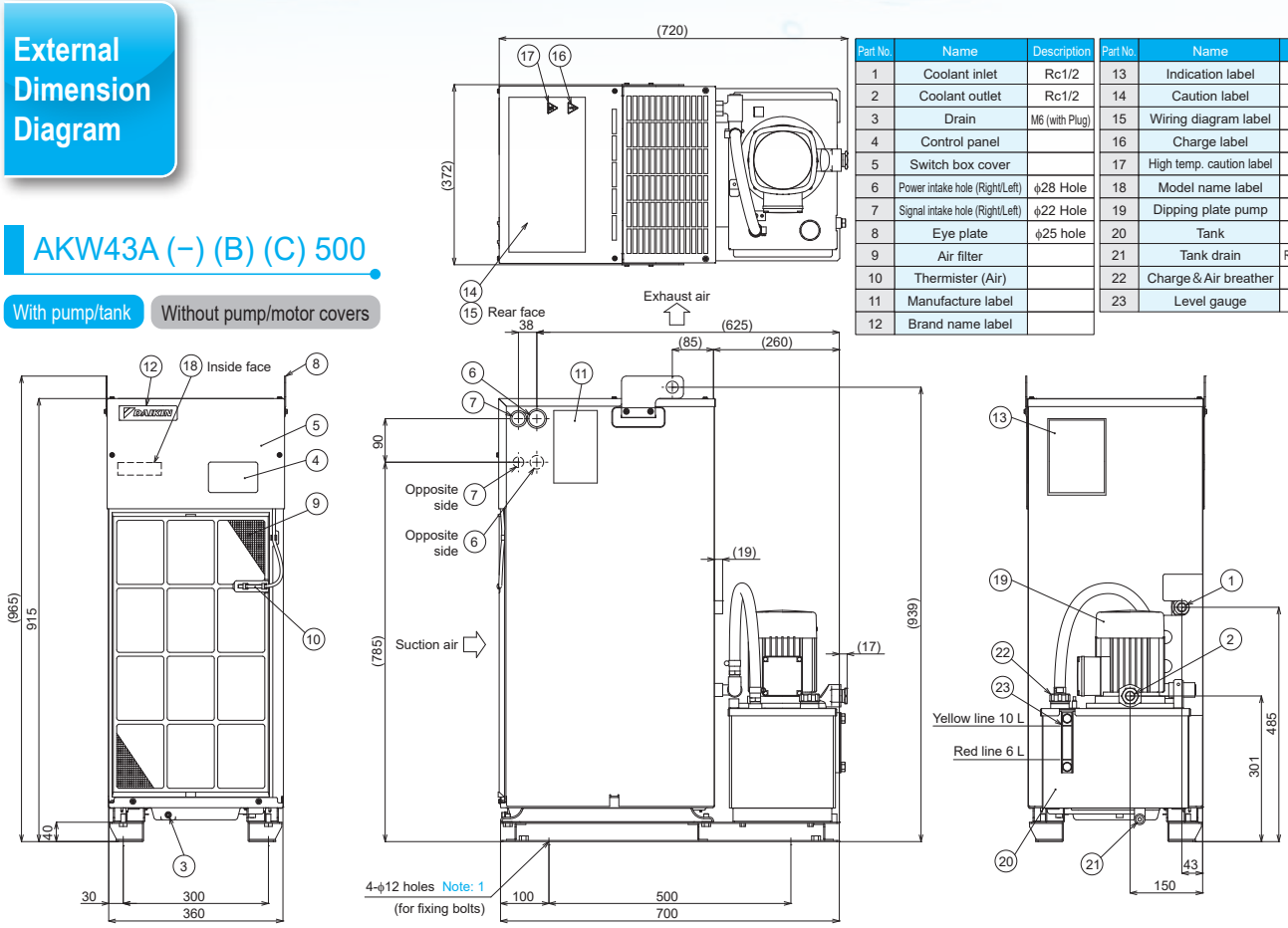
Part No.	Name	Description
13	Indication label	
14	Caution label	
15	Wiring diagram label	
16	Charge label	
17	High temp. caution label	
18	Model name label	

Note: 1. M10 hex bolts are recommended as the fixing bolts.

External Dimension Diagram

AKW43A (−) (B) (C) 500

With pump/tank | Without pump/motor covers



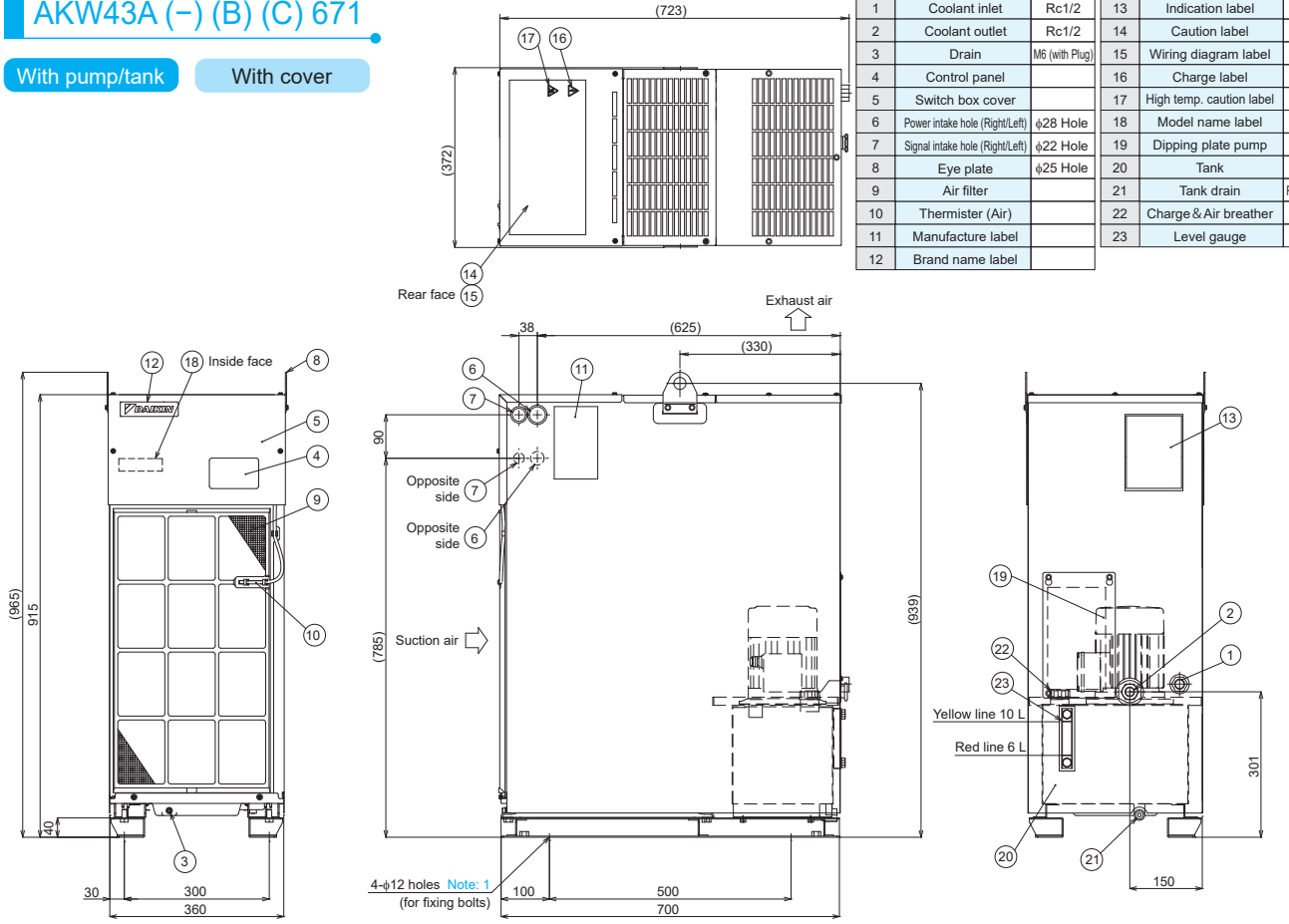
Part No.	Name	Description
1	Coolant inlet	Rc1/2
2	Coolant outlet	Rc1/2
3	Drain	M6 (with Plug)
4	Control panel	
5	Switch box cover	
6	Power intake hole (Right/Left)	ϕ28 Hole
7	Signal intake hole (Right/Left)	ϕ22 Hole
8	Eye plate	ϕ25 hole
9	Air filter	
10	Thermister (Air)	
11	Manufacture label	
12	Brand name label	

Part No.	Name	Description
13	Indication label	
14	Caution label	
15	Wiring diagram label	
16	Charge label	
17	High temp. caution label	
18	Model name label	
19	Dipping plate pump	
20	Tank	10 L
21	Tank drain	Rc3/8 (with Plug)
22	Charge & Air breather	
23	Level gauge	

Note: 1. M10 hex bolts are recommended as the fixing bolts.

AKW43A (−) (B) (C) 671

With pump/tank | With cover



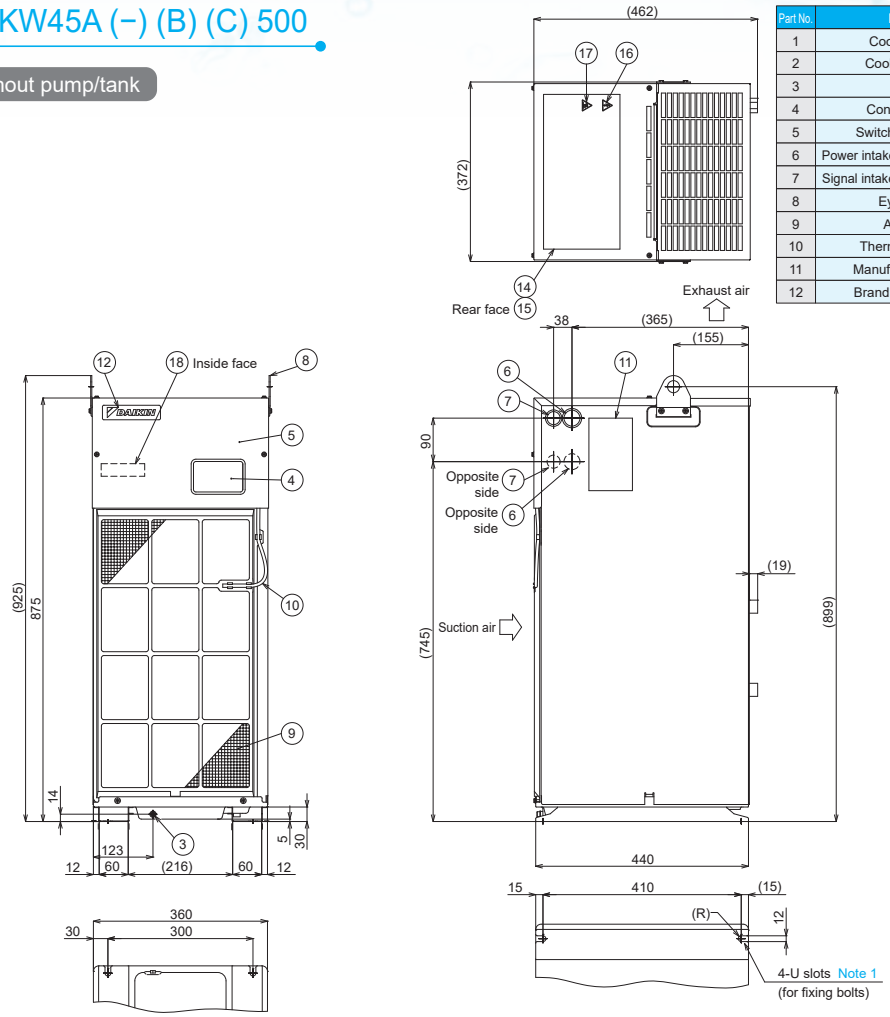
Part No.	Name	Description
1	Coolant inlet	Rc1/2
2	Coolant outlet	Rc1/2
3	Drain	M6 (with Plug)
4	Control panel	
5	Switch box cover	
6	Power intake hole (Right/Left)	ϕ28 Hole
7	Signal intake hole (Right/Left)	ϕ22 Hole
8	Eye plate	ϕ25 Hole
9	Air filter	
10	Thermister (Air)	
11	Manufacture label	
12	Brand name label	

Part No.	Name	Description
13	Indication label	
14	Caution label	
15	Wiring diagram label	
16	Charge label	
17	High temp. caution label	
18	Model name label	
19	Dipping plate pump	
20	Tank	10 L
21	Tank drain	Rc3/8 (with Plug)
22	Charge & Air breather	
23	Level gauge	

Note: 1. M10 hex bolts are recommended as the fixing bolts.

AKW45A (−) (B) (C) 500

Without pump/tank



Part No.	Name	Description
1	Coolant inlet	Rc1/2
2	Coolant outlet	Rc1/2
3	Drain	M6 (with Plug)
4	Control panel	
5	Switch box cover	
6	Power intake hole (Right/Left)	ϕ28 Hole
7	Signal intake hole (Right/Left)	ϕ22 Hole
8	Eye plate	ϕ25 Hole
9	Air filter	
10	Thermister (Air)	
11	Manufacture label	
12	Brand name label	

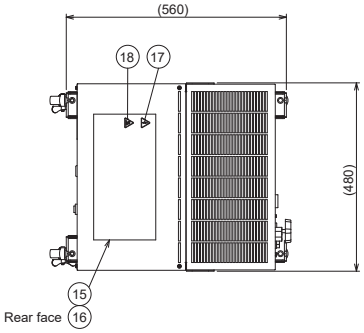
Part No.	Name	Description
13	Indication label	
14	Caution label	
15	Wiring diagram label	
16	Charge label	
17	High temp. caution label	
18	Model name label	

Note: 1. M10 hex bolts are recommended as the fixing bolts.

External Dimension Diagram

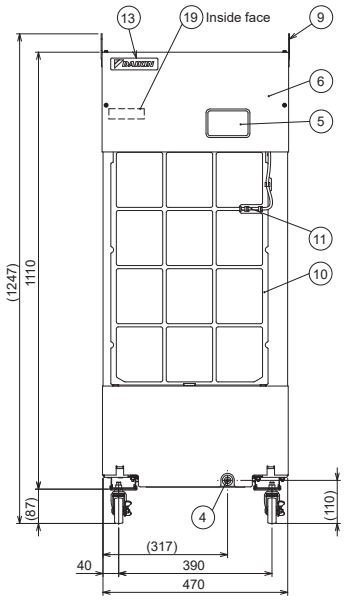
AKW56A (−) (B) (C) 500

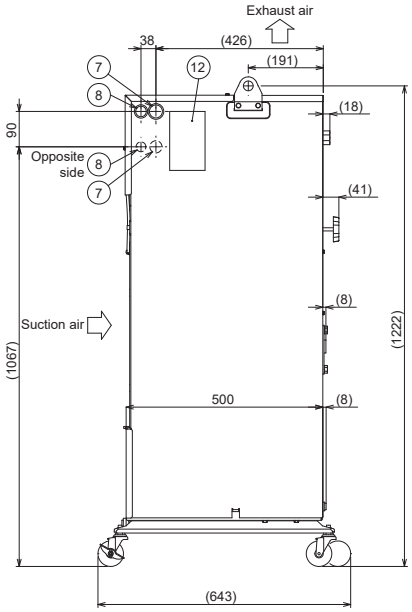
With pump/tank

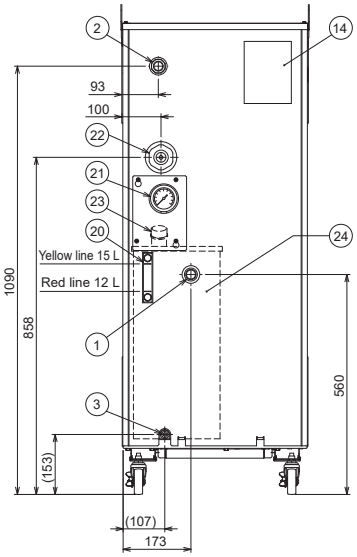


Part No.	Name	Description
1	Coolant inlet	Rc3/4
2	Coolant outlet	Rc3/4
3	Tank drain	Rc3/8 (with Plug)
4	Pump drain	Rc3/8 (with Plug)
5	Control panel	
6	Switch box cover	
7	Power intake hole (Right/Left)	ϕ28 hole
8	Signal intake hole (Right/Left)	ϕ22 hole
9	Eye plate	ϕ25 hole
10	Air filter	
11	Thermister (Air)	
12	Manufacture label	

Part No.	Name	Description
13	Brand name label	
14	Indication label	
15	Caution label	
16	Wiring diagram label	
17	Charge label	
18	High temp. caution label	
19	Model name label	
20	Level gauge	
21	Pressure gauge	
22	Glove valve	
23	Charge & Air breather	
24	Tank	15 L





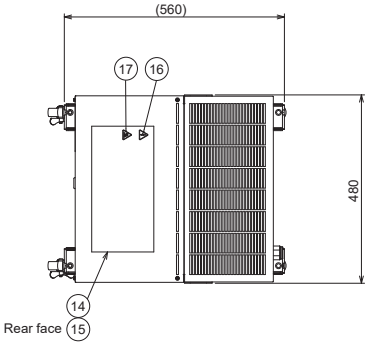


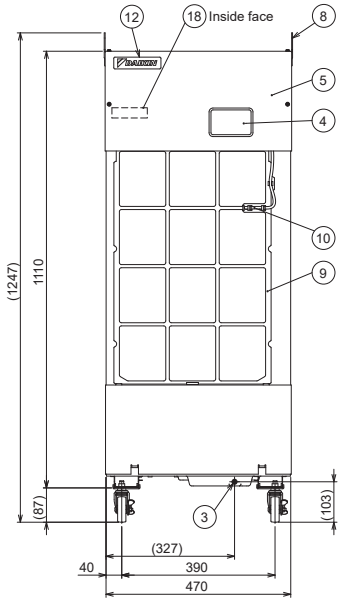
AKW58A(−)(B)(C)500

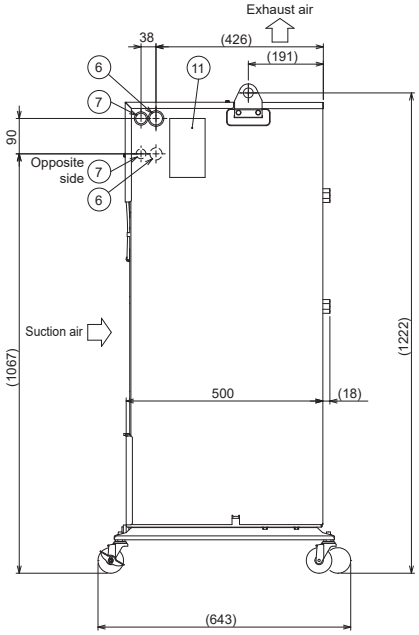
Without pump/tank

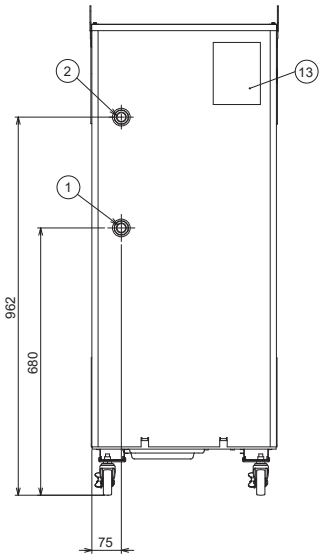
Part No.	Name	Description
1	Coolant inlet	Rc3/4
2	Coolant outlet	Rc3/4
3	Drain	M6 (with Plug)
4	Control panel	
5	Switch box cover	
6	Power intake hole (Right/Left)	ϕ28 Hole
7	Signal intake hole (Right/Left)	ϕ22 Hole
8	Eye plate	ϕ25 Hole
9	Air filter	
10	Thermister (Air)	
11	Manufacture label	
12	Brand name label	

Part No.	Name	Description
13	Indication label	
14	Caution label	
15	Wiring diagram label	
16	Charge label	
17	High temp. caution label	
18	Model name label	









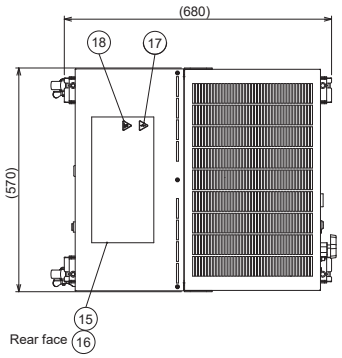
External Dimension Diagram

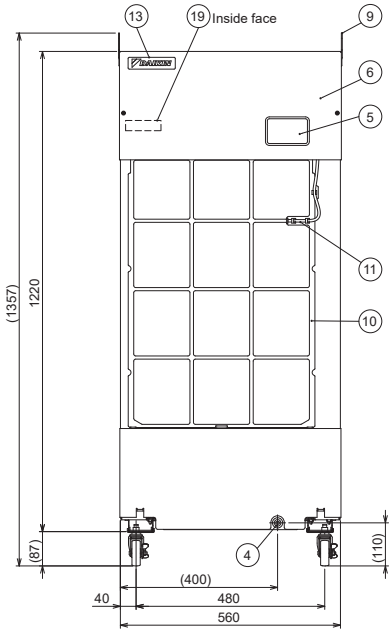
AKW90A (−) (B) (C) 500

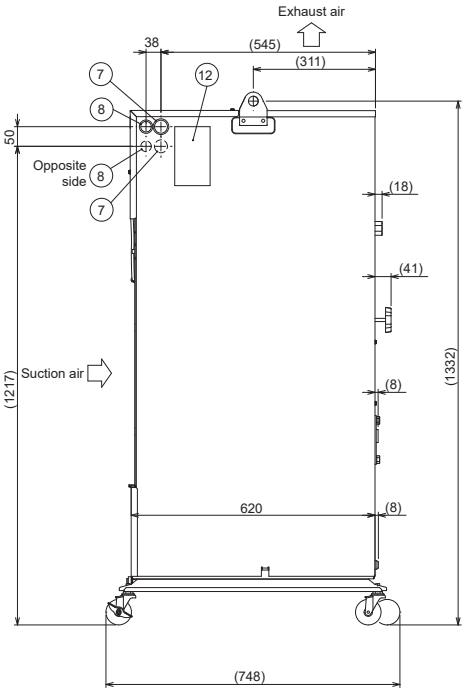
With pump/tank

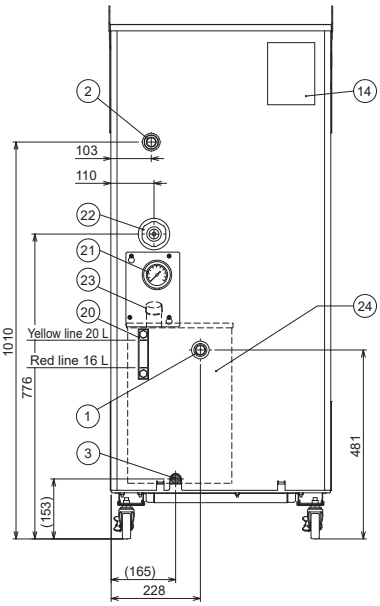
Part No.	Name	Description
1	Coolant inlet	Rc3/4
2	Coolant outlet	Rc3/4
3	Tank drain	Rc3/8 (with Plug)
4	Pump drain	Rc3/8 (with Plug)
5	Control panel	
6	Switch box cover	
7	Power intake hole (Right/Left)	ϕ28 hole
8	Signal intake hole (Right/Left)	ϕ22 hole
9	Eye plate	ϕ25 hole
10	Air filter	
11	Thermister (Air)	
12	Manufacture label	

Part No.	Name	Description
13	Brand name label	
14	Indication label	
15	Caution label	
16	Wiring diagram label	
17	Charge label	
18	High temp. caution label	
19	Model name label	
20	Level gauge	
21	Pressure gauge	
22	Glove valve	
23	Charge & Air breather	
24	Tank	20 L







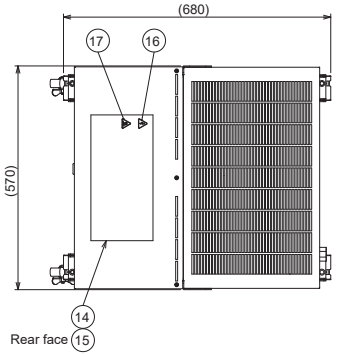


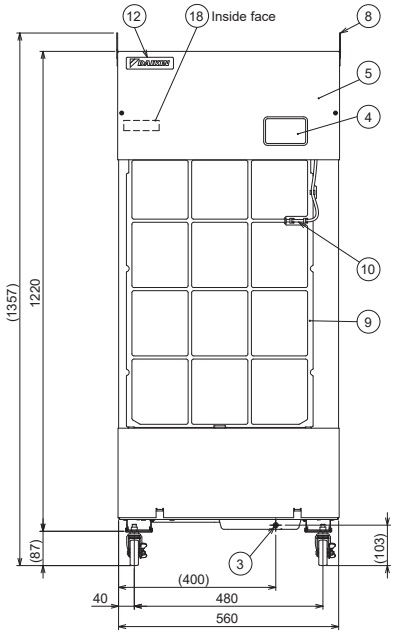
AKW92A (−) (B) (C) 500

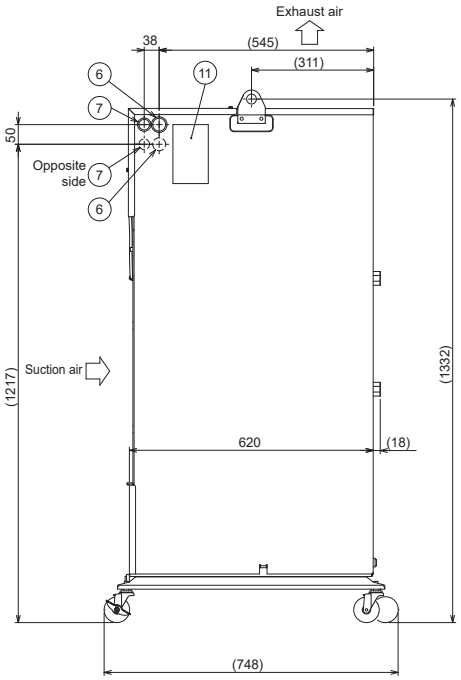
Without pump/tank

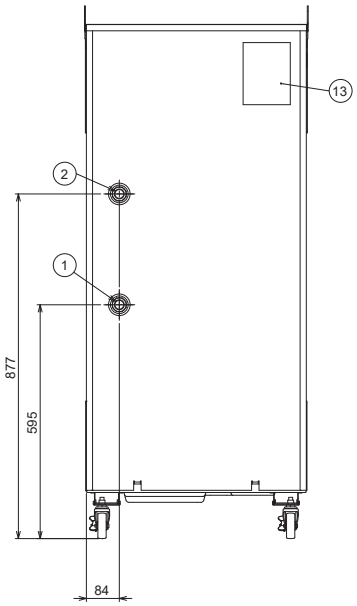
Part No.	Name	Description
1	Coolant inlet	Rc3/4
2	Coolant outlet	Rc3/4
3	Drain	M6 (with Plug)
4	Control panel	
5	Switch box cover	
6	Power intake hole (Right/Left)	ϕ28 Hole
7	Signal intake hole (Right/Left)	ϕ22 Hole
8	Eye plate	ϕ25 Hole
9	Air filter	
10	Thermister (Air)	
11	Manufacture label	
12	Brand name label	

Part No.	Name	Description
13	Indication label	
14	Caution label	
15	Wiring diagram label	
16	Charge label	
17	High temp. caution label	
18	Model name label	





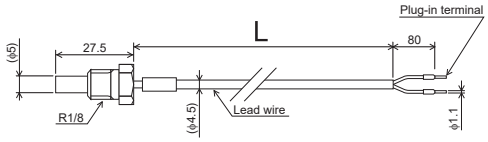
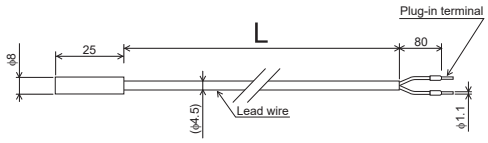
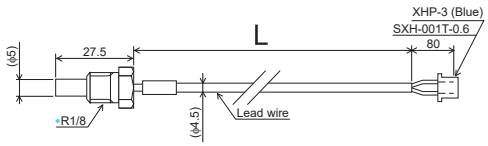




Optional Parts

●Thermistor models and applications

When this optional part is installed in the oil piping of the machine, the thermistor detects the oil or water temperature for the unit's operation.

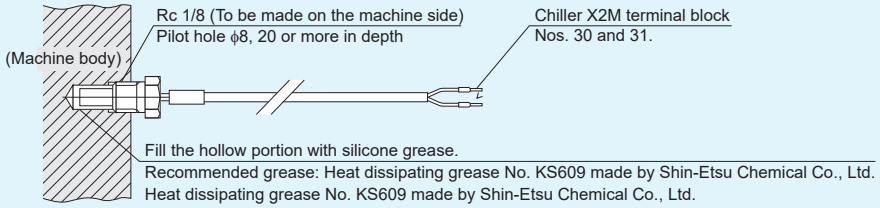
Name	Model	Length of lead wire L (m)	Figure	Application (To be installed by you)
Thermistor for machine body synchronization	AKZ-OP-K5	5 m		For machine temperature synchronization control (implanted in the machine body)
	AKZ-OP-K10	10 m		
	AKZ-OP-K15	15 m		
	AKZ-OP-A5	5 m		For machine temperature synchronization control (attached to the surface of the machine body)
	AKZ-OP-A10	10 m		
Thermistor for oil temperature control	AKZ-OP-Y5	5 m		For return fluid temperature control (Installed in the fluid pipe of the machine)
	AKZ-OP-Y10	10 m		

Thermistor characteristics: Resistance value … R25 (Resistance value at 25°C) = 20 kΩ, Tolerance: ±3%

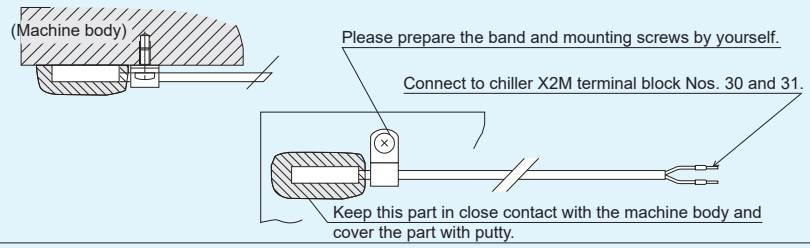
* The material in contact with the fluid is brass.

■Instruction for installation and connection

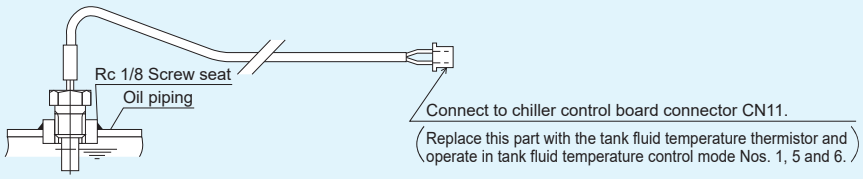
For AKZ-OP-K



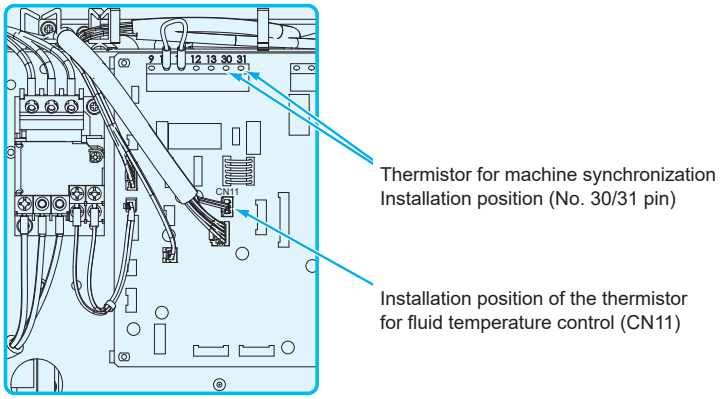
For AKZ-OP-A



For AKZ-OP-Y



■Installation positions of the thermistor for machine synchronization and thermistor for fluid temperature control



●Option board for communication (serial communication/parallel communication) compatible with 10 series inverter controlled chillers

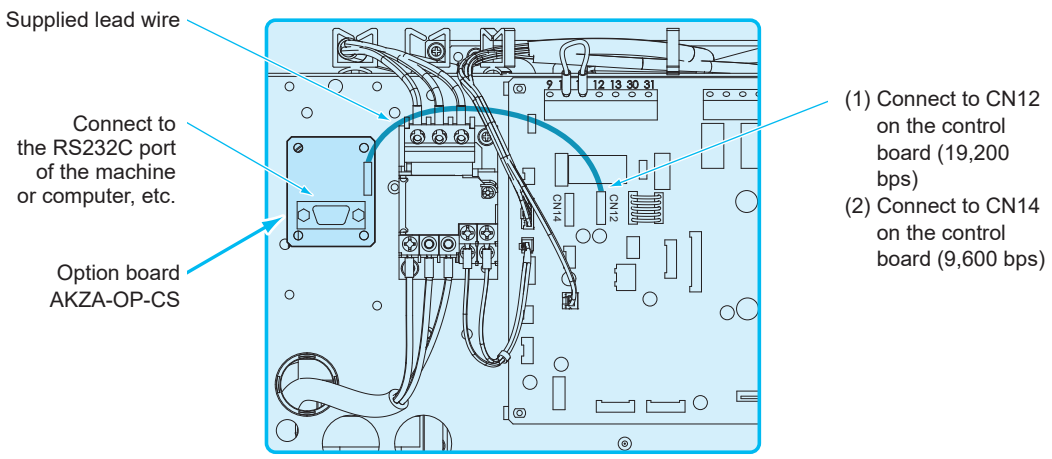
The following functions are enabled by mounting this option board on the control board of chiller and communicating with the machine side:

1. Changing the operation mode and the operation setting from the machine
2. The alarm code and various data, such as the evaporator outlet fluid temperature, tank fluid temperature, inverter frequency, of the chiller can be read from the machine side.

Communication method	Model	Installation position	Applicable model
Serial communication RS232C	AKZA-OP-CS	DAIKIN proprietary protocol	PIM00603
Serial communication RS232C	AKZA-OP-CSP		PIM00614
Parallel communication			

Note: For details on the communication procedure and specifications, refer to the dedicated instruction manual

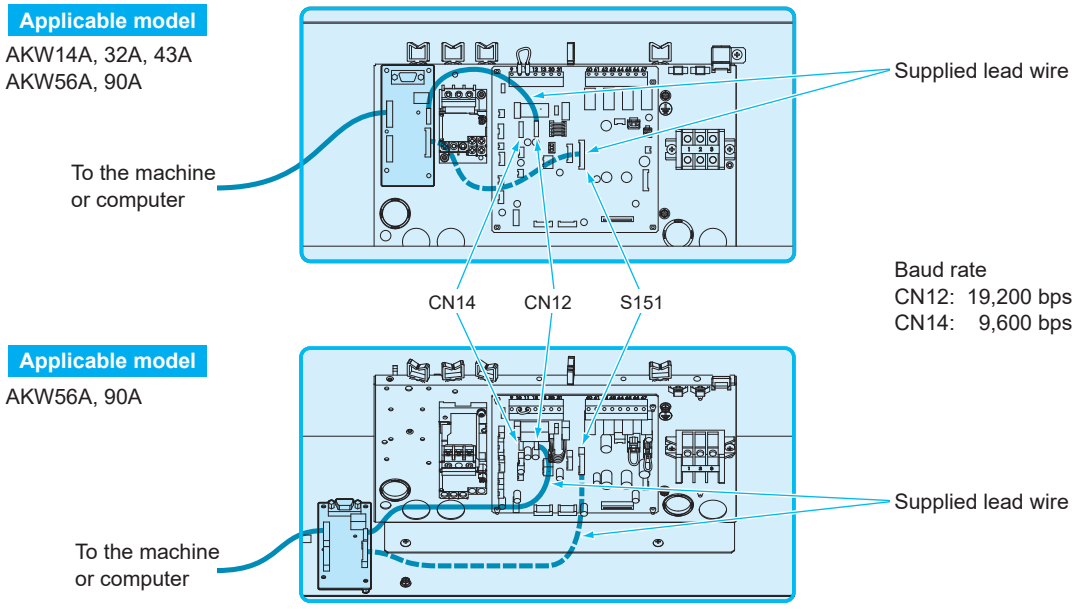
■Mounting the AKZA-OP-CS serial communication option board



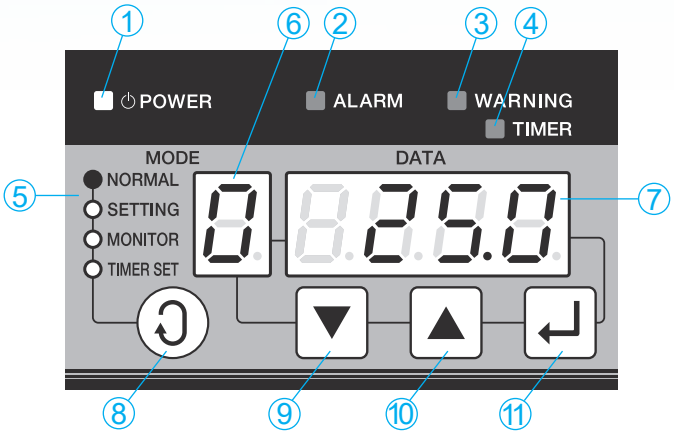
• Dimensions of communication board (W × H): 40 × 50
• The communication board is secured at four positions by locking support.

■Mounting the AKZA-OP-CSP serial communication/parallel communication option board

The possible installation positions differ depending on the model.



●Part Names, Functions and Operation of Control Panel

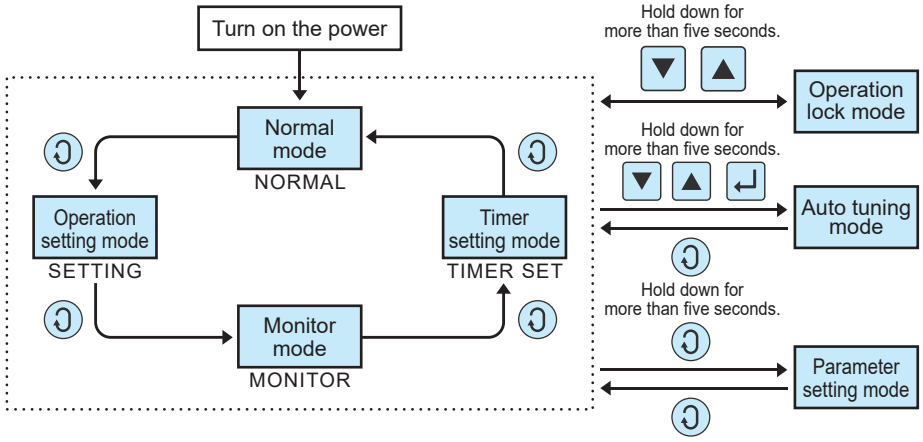


No.	Item	Description
①	Power lamp (Green)	The lamp is turned on while power is supplied.
②	Error warning lamp (Red)	When an error occurs: Level 1 alarm: The lamp keeps blinking. Level 2 alarm: The lamp is continuously on.
③	Warning lamp (Green)	When a warning occurs: Level 1 warning: The lamp keeps blinking. Level 2 warning: The lamp is turned on.
		For details on alarms and warnings, refer to the instruction manual.
④	Timer mode lamp (Green)	The lamp keeps blinking while the machine is at a stop in the timer mode.
⑤	Operation mode display	Displays the mode of the control panel. NORMAL: Normal mode MONITOR: Monitor mode SETTING: Operation setting mode TIMER SET: Timer setting mode
⑥	Operation mode/ Data No. display	Displays the current operation mode (Normal mode/Operation setting mode) or data number of the data currently displayed on the data display.
⑦	Data display	Displays various data. The data displayed differs depending on the operation mode and data number.
⑧	[SELECT] (Select) key	Selects the operation mode.
⑨	[DOWN] key	Decrements the value of the operation mode, data number or data by 1 (0.1). When held for two seconds or longer, decrements the values by 10 (1).
⑩	[UP] key	Increments the value of the operation mode, data number or data by 1 (0.1). When held for two seconds or longer, increments the values by 10 (1).
⑪	[ENTER] (Determine) key	Determines the operation mode, data number, and data to be changed.

■Operation for changing to each mode

The mode can be changed by operating the ↻ key in general.

To enter a special mode, hold down a number of keys in combination for more than five seconds.



⚠CAUTION

■The default setting is"Operation lock mode".
To start operation, perform the unlocking operation as shown above.

■The default setting for operation on the standard machine is:

Operation mode: AKW14A/32A/43A: 5 (tank fluid temperature, room temperature synchronization control)
AKW18A/35A/45A: 3 (evaporator outlet fluid temperature, room temperature synchronization control)
AKW56A/90A: 3 (tank fluid temperature, room temperature synchronization control)
AKW58A/92A: 3 (evaporator inlet fluid temperature, room temperature synchronization control)
Differential temperature: 0.0 (°C)

●Operation Mode and Setting Method

Operation mode No.	Mode name	Description	Setting temperature range	Necessary optional part
Operation mode 0	AKW14A to 45A: Evaporator outlet fluid temperature, fixed temperature control AKW56A, 90A: Tank fluid temperature, fixed temperature control AKW58A, 92A: Evaporator inlet fluid temperature, fixed temperature control	Keep the set fluid temperature within the range indicated to the right.	5 to 45°C	
Operation mode 1	AKW14A to 45A: Tank fluid temperature or return fluid temperature, fixed temperature control AKW56A to 92A: Evaporator outlet fluid temperature or return fluid temperature, fixed temperature control		5 to 45°C	Fluid temperature control thermistor (When return fluid temperature is controlled)
Operation mode 3	AKW14A to 45A: Evaporator outlet fluid temperature, room temperature synchronization control AKW56A, 90A: Tank fluid temperature, room temperature synchronization control AKW58A, 92A: Evaporator inlet fluid temperature, room temperature synchronization control		Between Room temperature −9.9°C and Room temperature +9.9°C	
Operation mode 4	AKW14A to 45A: Evaporator outlet fluid temperature, machine temperature synchronization control AKW56A, 90A: Tank fluid temperature, machine temperature synchronization control AKW58A, 92A: Evaporator inlet fluid temperature, machine temperature synchronization control		Between Machine temperature −9.9°C and Machine temperature +9.9°C	Machine synchronization thermistor
Operation mode 5	AKW14A to 45A: Tank fluid temperature or return fluid temperature, room temperature synchronization control AKW56A to 92A: Evaporator outlet fluid temperature or return fluid temperature, room temperature synchronization control		Between Room temperature −9.9°C and Room temperature +9.9°C	Fluid temperature control thermistor (When return fluid temperature is controlled)
Operation mode 6	AKW14A to 45A: Tank fluid temperature or return fluid temperature, machine temperature synchronization control AKW56A to 92A: Evaporator outlet fluid temperature or return fluid temperature, machine temperature synchronization control		Between Machine temperature −9.9°C and Machine temperature +9.9°C	Fluid temperature control thermistor (When return fluid temperature is controlled) Machine synchronization thermistor

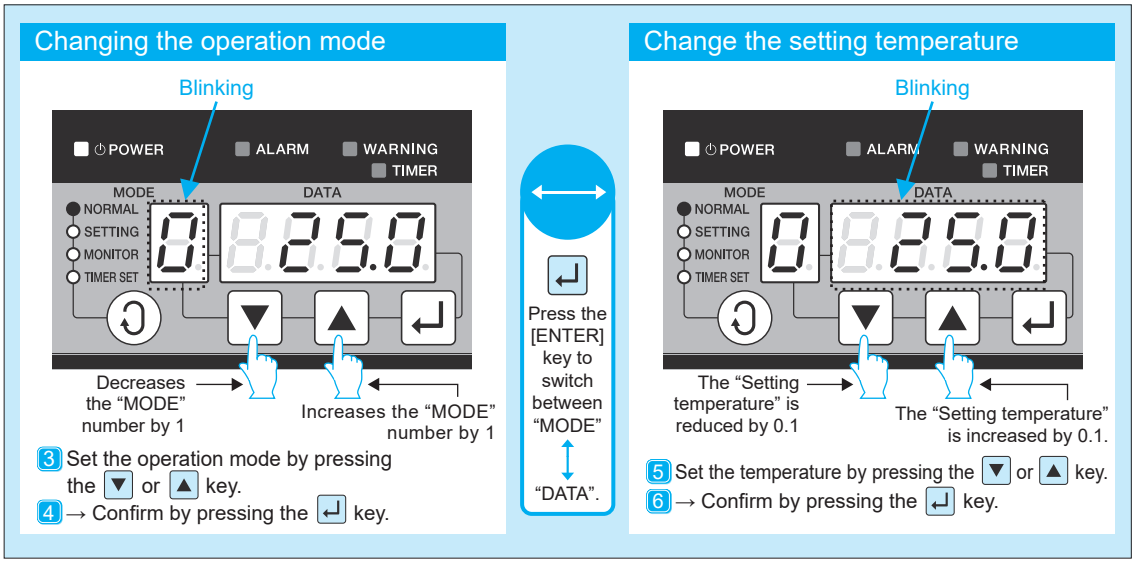
Note 1: Operation modes 2, 7, and 8 cannot be used. Note 2: Refer to Page 19 for details of required optional parts.

■Setting procedure

Default setting: Set to operation mode 3 or 5, and a temperature of 0.0 °C
To use the equipment other than at the default setting, change the setting by following the procedure below.

1 Power ON..... Release the operation lock mode before starting operation for the first time.
(Hold down the ▼ and ▲ keys simultaneously for more than 5 seconds.)

2 Select the "SETTING" operation setting mode (press the ↺ key once).



7 To return to the "NORMAL" mode, press the ↺ key three times.

●Points Checked in the Monitor Mode

The following points can be checked in the monitor mode.

Monitor No.	Description			Note
	AKW14A to 45A	AKW56A, 90A	AKW58A, 92A	
0	Machine body temperature [Th1]			∗1
1	Tank fluid temperature or return fluid temperature [Th2]	Evaporator outlet fluid temperature or return fluid temperature [Th2]		∗1
2	Room temperature [Th3]			∗1
3	Evaporator outlet fluid temperature [Th4]	Tank fluid temperature [Th4]	Evaporator inlet fluid temperature [Th4]	∗1
4	Intake pipe temperature [Th5]			∗1

Monitor No.	Description			Note
	AKW14A to 45A	AKW56A, 90A	AKW58A, 92A	
5	△T (Th4−Th2)			∗1
6	Cooling capacity direct control command value (%)			−
7	Inverter compressor rotational speed (rps)			−
8	Power consumption (kW)			∗2
9	Extended DIN (hundreds digit), DOUT (tens digit) status			∗3

∗1. If the thermistor is not connected or has a broken wire, −99.9 is displayed.

∗2. This is the value obtained by rough calculation under the following conditions (the error is around 20%): power supply voltage of 400 V, rated circulation).

∗3. With the default setting, 0 is displayed. Note that display is enabled when parameter n020 is "1" or the optional communication extension board is installed.

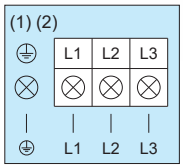
Electric Wiring Connection Instruction

1 Power supply capacity···· Refer to the maximum power consumption/maximum current consumption panel of the specifications table (Pages 5 and 6).

2 Connection to power supply terminal block (X1M)

(1) With standard specifications and CE specifications (C type), connect to X1M.

(2) In the case of "with breaker" (B) specifications, connect to the circuit breaker.



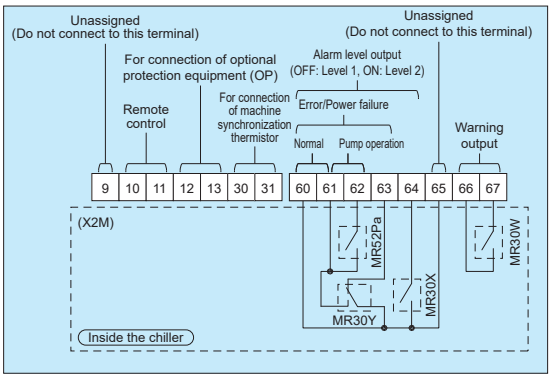
1. Screw terminal and wiring diameter

Series	Terminal block	Screw terminal	Wiring diameter	
			IEC cable	UL cable
AKW 14A, 18A, 32A, 35A, 43A, 45A, 56A, 58A	X1M	M4, M5	2.5 mm² or greater	AWG#14 or greater
	Breaker	M5		
AKW 90A, 92A	X1M	M5	4.0 mm² or greater	AWG#12 or greater
	Breaker	M5		

2. Use a round crimp-style terminal for connection.

3. The terminal block is for three poles and the earth wire is to be secured on the enclosure with a screw.

3 Connection to signal terminal block (X2M)



1. Straight crimp terminal and wiring diameter

Straight pin terminals	Wiring diameter	
	IEC cable	UL cable
*1	0.3 mm² to 1.5 mm²	AWG#22 to #16

2. Use a straight crimp-style terminal for connection.
3. Use stranded wires for electric connection.
4. The wiring size is 0.5 mm² to 1.5 mm² in the case of duplex cable according to IEC.
   If using stripped wires, make the stripped length 9 to 10 mm.

*1. Recommended models and manufacturers:
TGN TC-1.25-9T (NICHIFU Co., Ltd.)

DANGER

1. Always install an all-pole (3-pole) earth leakage breaker*2 (to be prepared by you) of the specified capacity on the main power supply.
   *2. All contact distances must be at least 3 mm.
2. Always ground the machine. Since a noise filter is installed, there is a risk of electrical shock without proper grounding.
3. Before opening the electric component box, always turn off the power, and wait for 5 minutes until internal high voltage has been discharged.
4. Do not energize the equipment with the electric component box kept open.

CAUTION

1. To avoid the effects of noise, connect the power wire by cutting it to the proper length so that no excess wire comes into contact with the control board or elsewhere.
2. To perform remote control, remove the short-circuit wire between [10] and [11] and install an operation switch (to be prepared by you).
3. The mode is set to "Lock mode (Stop mode)" by default. Before starting operation, follow the procedure to release the Lock mode from the control panel. Refer to page 17 for the unlocking procedure.
4. The unit is provided with a misoperation prevention switch (PROTECT) to reject setting from the control panel. If you want to use this function, make the necessary setting referring to the instruction manual.

4 Signal output time chart

(1) Alarm/operation status output chart

Signal output \ Operation status			Remote operation (between [10] and [11])							
			ON				OFF			
			Normal	Level 1 Error or LOCK	Level 2 Error	Power failure (Power OFF)	Normal	Level 1 Error or LOCK	Level 2 Error	Power failure (Power OFF)
Normal ("a" contact)	60 – 61	ON								
		OFF								
Error/Stop (Power OFF) ("b" contact)	60 – 63	ON								
		OFF								
Error level ("a" contact)	60 – 64	ON								
		OFF								
Pump operation ("a" contact)	61 – 62	ON								
		OFF								

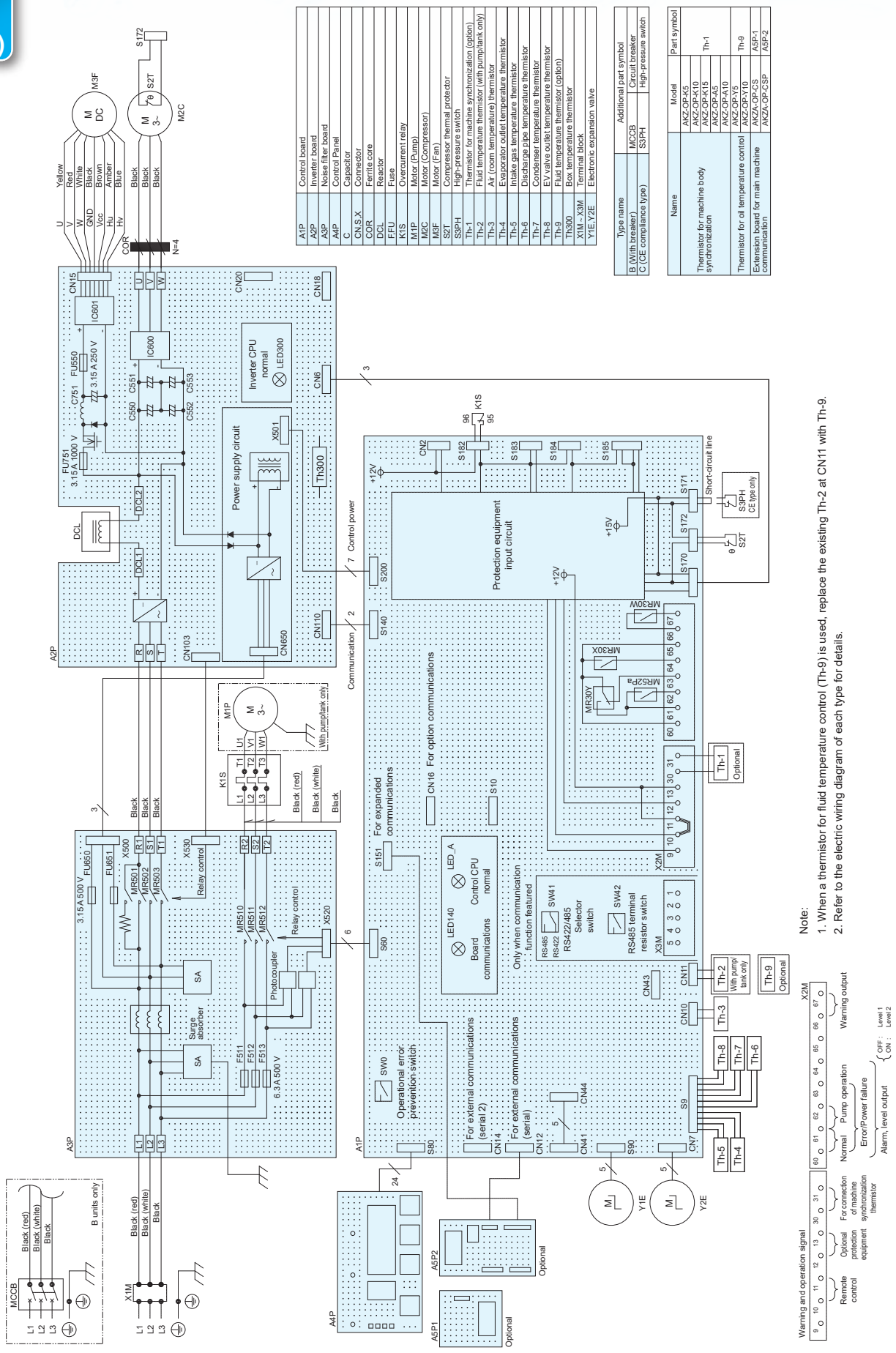
(2) Warning output chart

Signal output \ Operation status			Non-warning status				Warning status			
			Normal	Level 1 Error or LOCK	Level 2 Error	Power failure (Power OFF)	Normal	Level 1 Error or LOCK	Level 2 Error	Power failure (Power OFF)
Warning output ("a" contact")	66 – 67	ON								
		OFF								

CAUTION

1. The following electric wires can be used on the terminal block for straight crimp-style terminals.
   Single wire: ϕ0.57 to ϕ1.44 (AWG#22 to #16)
   Stranded wire: 0.25 mm² to 1.25 mm² (AWG#22 to 16)
2. Load applicable to [60 - 64] and [66 - 67] is as follows:
   Min. applicable load: 5 VDC, 1 mA or greater
   Max. applicable load: 24 VDC, 2 A (Resistance load)
3. For [10] to [13], please prepare contacts to meet the condition of minimum applicable load 12 VDC and 5 mA.
4. When the length of the thermistor to be connected to [30] - [31] is longer than 10 m, or the wiring is routed in a poor noise environment, use shielded wire.

Electric Wiring Diagram (Typical diagram)



Electric Wiring Connection Instruction / Electric Wiring Diagram

AKW 10 series

Pump Flow Rate Characteristics

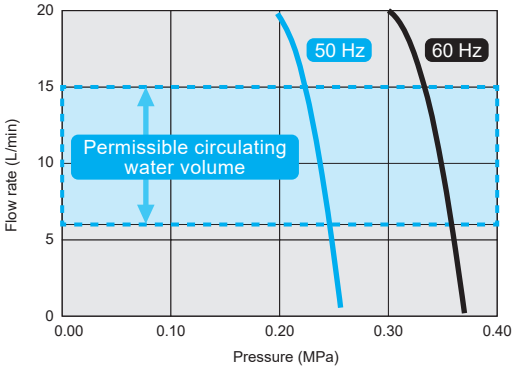
- The following diagrams show the flow characteristics of the pumps with the internal pressure loss for the standard specifications taken into account.

Note that the flow rate characteristics are those for water. The flow rate characteristics are lower when cooling with ethylene glycol solution.

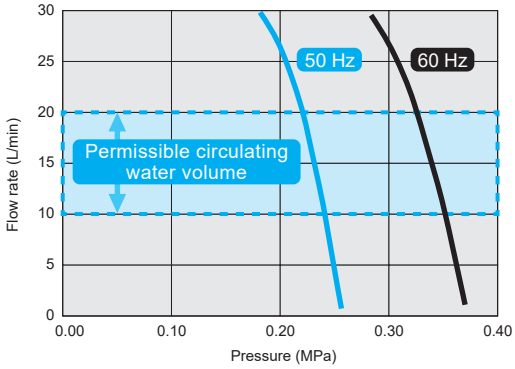
Select the diameters and lengths of pipe so as to keep the circulating volume within the permissible range.

Pump flow characteristics outside the standard specifications can also be supported.

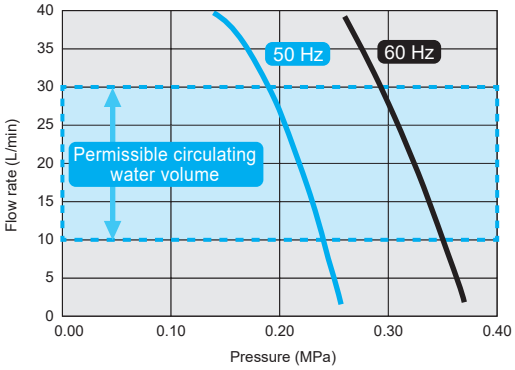
AKW14A-500



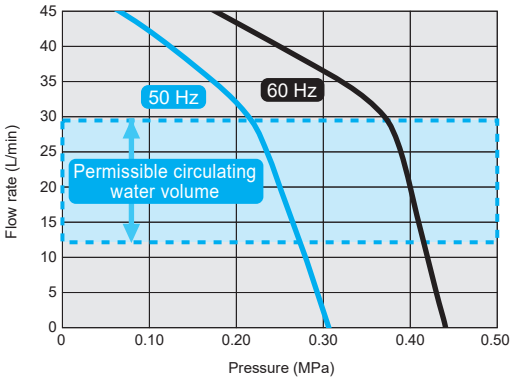
AKW32A-500



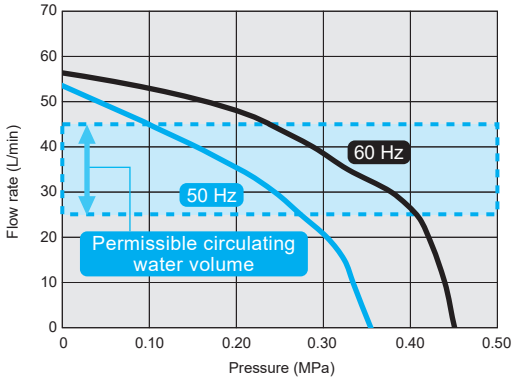
AKW43A-500



AKW56A-500



AKW90A-500



Notes for Handling

● Important notes to be observed regarding the machine side (machine tools and industrial machinery)

1. When rough transport conditions are expected while transporting the machine overseas or elsewhere, special precautions should be taken in the packaging and transportation method so as to avoid the application of excessive force on the chiller (this unit).
2. The chiller (this unit) does not incorporate a flow switch for checking the fluid supply or a temperature switch for abnormal temperature (high temperature or low temperature) of the fluid supplied. So, please provide protection devices such as a flow switch and temperature switch at the machine side.

Notes for operation and cooling capacity

1. Do not use the chiller to cool a fluid from 45°C or higher. Start running the chiller at the same time as the machine or before the fluid temperature rises to 40°C.
2. Do not place an object that hinders ventilation within 500 mm of the air-intake or exhaust.
3. If the air filter is clogged, the cooling capacity will be reduced. Clean the air filter (wash with warm water or clean with air) periodically once every two weeks to prevent clogging.

*Before operating this unit, be sure to read the operation manual and properly understand it.

● Instructions for safe operation

Signs and Instructions

⚠ DANGER.....Failure to observe the instruction may cause an imminent hazardous situation that may result in personal death or serious injury.
⚠ WARNING...Failure to observe the instruction may result in personal death or serious injury.
⚠ CAUTION....Failure to observe the instruction may result in personal injury or damage to the property.

① General instructions

[⚠ DANGER] (1) Use the equipment only in accordance with the intended specifications (specified in brochure, specification sheet, operation manual, and caution plates).
[⚠ DANGER] (2) Never operate the equipment in an explosive atmosphere.
[⚠ DANGER] (3) Do not disassemble, repair or modify the equipment by yourself.
[⚠ DANGER] (4) Always comply with the laws and regulations for safety (Industrial Safety and Health Law and Fire Defense Law).
[⚠ WARNING] (5) Caution in the event of refrigerant leak
- Ventilate the room adequately (to avoid the risk of suffocation).
- Avoid direct contact of the refrigerant with skin (to avoid the risk of cryogenic burns).
- In the event of inhalation of a great deal of refrigerant, contact with skin, or refrigerant in the eye, seek medical attention immediately.

[⚠ WARNING] (6) In the event of an abnormal condition, stop operation promptly, investigate the cause of the problem and take appropriate remedial measures.
[⚠ CAUTION] (7) Do not use the unit in atypical environments (locations subject to high temperatures, high humidity, or a lot of dust, contamination, steam, oil mist or corrosive gases: H_2S, SO_2, NO_2 or $C\ell_2$).
[⚠ CAUTION] (8) Install a flow switch and temperature switch on the machine to protect the spindle and other components.
[⚠ CAUTION] (9) Do not get on the equipment or place an object on the equipment.
[⚠ CAUTION] (10) Use the unit at an altitude of up to 2,000 m. At altitudes in excess of 1,000 m the cooling capacity decreases by around 20 to 30%, so please select a model with adequate leeway in terms of cooling capacity.

② Instructions for transportation

[⚠ DANGER] (1) When hoisting the equipment, check its weight and use the eye plates and hangers on it properly.
[⚠ DANGER] (2) When hoisting the equipment, do not do so while it is fitted with a tank or anything else that you have provided.
[⚠ WARNING] (3) Do not approach the equipment while it is being hoisted and moved.
[⚠ CAUTION] (4) When moving the equipment, take appropriate measures for fall prevention.
[⚠ CAUTION] (5) Do not tilt the equipment 30 degrees or more while transporting it (including during storage).

③ Instructions for installation

[⚠ WARNING] (1) Install the equipment on a rigid, level foundation and secure it appropriately.
[⚠ CAUTION] (2) Do not place an object near the suction port or discharge port of the equipment.

④ Instructions for wiring and piping installation

[⚠ DANGER] (1) Wiring and piping installation should be performed by a person with specialized knowledge and skills.
[⚠ DANGER] (2) Always use a commercial power supply for the power source. (The use of an inverter power supply may cause burn damage).
[⚠ DANGER] (3) Connect the wiring for power supply in accordance with the electric wiring instruction diagram of the specification sheet and operation manual.
[⚠ DANGER] (4) Ground the equipment properly.
[⚠ WARNING] (5) Install the wiring in accordance with the standard by checking the electric wiring diagram.
[⚠CAUTION] (6) Always install a dedicated all-pole (3-pole) earth leakage breaker appropriate for the capacity of the chiller on the main power supply on site.
[⚠CAUTION] (7) Check to see that the fluid piping has a pressure resistance of 1 MPa or more and install the piping appropriately.

⑤ Instructions for trial run

[⚠CAUTION] (1) Check to see that the machine is in a safe status (not activated) before starting the trial run.
[⚠CAUTION] (2) Check to see that the oil piping and electric wiring are correctly connected to the machine and that there is no looseness in connections and joints.
[⚠CAUTION] (3) Disable the operation lock of the equipment (Oil Cooling Unit) before starting the machine.
[⚠CAUTION] (4) Check that the fluid piping system contains the required amount of fluid, and that the piping is not blocked part way through.

⑥ Instructions during operation

[⚠ DANGER] (1) Do not splash water or liquid on the equipment.
[⚠ WARNING] (2) Do not push your finger or an object into gaps of the equipment.
[⚠CAUTION] (3) Do not touch the heated exhaust port of the equipment.

⑦ Instructions for maintenance and inspection

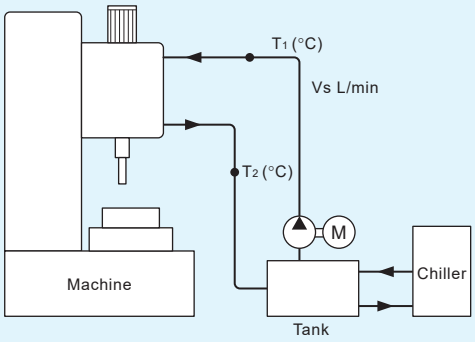
[⚠ DANGER] (1) Perform maintenance and inspection with the equipment kept open. Working in a closed status may result in suffocation due to the leak of refrigerant.
[⚠ DANGER] (2) Always turn off the main power supply before starting maintenance and inspection.
[⚠ DANGER] (3) Wait for five minutes after turning off the main power supply before starting maintenance and inspection operation.
[⚠ DANGER] (4) Do not operate the equipment with its cover opened.
[⚠CAUTION] (5) Wear protective gear such as gloves and an eye protector when performing maintenance, inspection and cleaning.
[⚠CAUTION] (6) Clean the air filter periodically (once every two weeks in general).
[⚠CAUTION] (7) Ensure that the water quality and concentration of the fluid meet the standards at all times.
[⚠CAUTION] (8) Check the fluid level in the tank and ensure that it is between the yellow line and the red line.
[⚠CAUTION] (9) Inspect the underneath (drain pan) of the chiller once every six months, and if fluid has accumulated, discharge it through the drainage port.

Selection Method for Chillers

1. Select a chiller with a cooling capacity 20 to 30% larger than the amount of heat generated by the machine tool.
2. Since the cooling capacity of chillers varies with changes in the fluid temperature and room temperature, the fluid temperature and room temperature conditions have to be clarified to select the appropriate chiller.
3. Three methods are shown below as a guide to estimating the amount of heat generated from the machine tool. Ultimately, tests have to be conducted to determine the exact amount of heat generation in order to select the appropriate chiller.

Unit conversion formula ●1 kW = 860 kcal/h

Example calculation 1 Estimating the amount of heat generation from the temperature difference between the inlet and outlet for fluid going to the machine



$$Q = \frac{V \times \rho \times Cp \times \triangle T}{1000 \times 60}$$

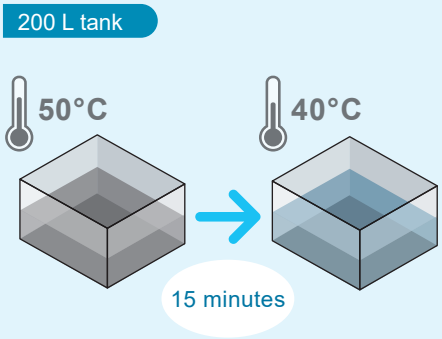
Q : Heat release value (kW)
Cp : Specific heat (kJ/kg·°C)
Vs: Flow rate (L/min)
△T: Temperature difference (°C)
ρ : Density (kg/m³)

Example calculation When "Vs" is 30 L/min and "ΔT" is 5°C

$$Q = \frac{30\ L/min \times 998\ kg/m^3 \times 4.18\ kJ/kg°C \times 5°C}{1000 \times 60}$$

$$\approx 10.43\ kW$$

Example calculation 2 When it is desired to cool 200 L of fluid from 50°C to 40°C within 15 minutes



$$Q = \frac{V \times \rho \times Cp \times \triangle T}{1000 \times 60 \times t}$$

Q : Heat release value (kW)
Cp : Specific heat (kJ/kg·°C)
V : Tank fluid capacity (L)
△T: Temperature difference (°C)
ρ : Density (kg/m³)
t : Time (min)

Example calculation When it is desired to cool 200 L of fluid from 50°C to 40°C within 15 minutes

$$Q = \frac{200\ L \times 998\ kg/m^3 \times 4.18\ kJ/kg°C \times (50-40)°C}{1000 \times 60 \times 15\ min}$$

≈ A cooling capacity of **approx. 9.27 kW** or greater is required.

Example calculation 3 When the motor output loss is considered to be the amount of heat generation

$$Q = H \cdot \frac{\eta}{100}$$

Q : Heat release value (kW)
H : Motor output (kW)… For driving the spindle
η : Motor output loss (%)

Example calculation When the output loss is 30% with a motor output of 7.5 kW
→ The output loss is 30% or so in general (Cooling of main shaft head)

Q = 7.5 × 0.3 = 2.3 (kW)

Note: Effect of heat absorption and dissipation from the surface of the tank and piping
Depending on the tank and piping surface area and ambient temperature, heat absorption and heat dissipation may increase. If the effect of heat absorption and heat dissipation is large, select a model with this effect taken into account.

Physical property values

Name of substance	Specific heat kJ/(kg·°C)	Density (kg/m³)
Water	4.18	998
Aluminum	0.900	2710
Iron	0.460	7870
Copper	0.385	8960

* The numbers in the table are reference values, so please use them as a guide.
* All property values (some being calculated values) are at 20°C.

Overseas Service Network

DAIKIN Oil Cooling Unit/Chiller Overseas Service Network

Something DAIKIN can offer as a global manufacturer of air conditioning equipment

Overseas Service Network

Please contact the DAIKIN Sales Counter for servicing of Oil Cooling Units/Chillers in countries outside Japan.

DAIKIN is ready to offer you service in conjunction with the sales agents of our Air-conditioning and Hydraulic Divisions located in nine countries and regions worldwide.

Country	Region	Company name
China	Shanghai	◎KAILING HYDRAULICS TECHNOLOGY (Shanghai) CO.,LTD.
		DAIKIN AIR CONDITIONING TECHNOLOGY (Shanghai) CO.,LTD.
	Beijing	DAIKIN AIR CONDITIONING TECHNOLOGY (Beijing) CO.,LTD.
	Guangzhou	DAIKIN AIR CONDITIONING TECHNOLOGY (Guangzhou) CO.,LTD.
Korea	Seoul	◎KD HYDRAULICS,LTD.
Taiwan	Taipei	HO TAI SERVICE & MARKETING CO.,LTD.
Vietnam	Hanoi	◎AN PHAT EQUIPMENT & ACCESSORIES CO., LTD.
Singapore	Singapore	◎ZICOM PRIVATE LTD.
Thailand	Bangkok	◎NANDEE INTER-TRADE CO., LTD.
Indonesia	Jakarta	◎PT. ETERNA KARYA SEJAHTERA
Germany	Ulm	◎SAUER BIBUS GMBH
U.S.	Illinois	◎ALL WORLD MACHINERY SUPPLY INC.
Mexico	Queretaro	◎ALL WORLD MACHINERY SUPPLY INC. Mexico Branch

◎: Sales desks for hydraulic equipment. The others are companies related to air conditioning. (As of June 2022)

MEMO

MEMO

Inverter Controlled Chiller

AKW10 SERIES

DAIKIN INDUSTRIES, LTD.

Oil Hydraulic Equipment

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A member of DAIKIN group

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GK268A(2022.06.010)DF.MD.MD